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DIV. OF FISHES

# COMMERCIAL FISHERIES REVIEW

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## FISH AND WILDLIFE SERVICE

ARNIE J. SUOMELA, COMMISSIONER



# COMMERCIAL FISHERIES REVIEW



## BUREAU OF COMMERCIAL FISHERIES

DONALD L. MCKERNAN, DIRECTOR

## DIVISION OF INDUSTRIAL RESEARCH AND SERVICES

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A review of developments and news of the fishery industries  
prepared in the BUREAU OF COMMERCIAL FISHERIES.

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## SUMMARY REPORT OF EXPLORATORY LONG-LINE FISHING FOR TUNA IN GULF OF MEXICO AND CARIBBEAN SEA, 1954-1957

By Fredrick Wathne\*

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### BACKGROUND

Exploratory fishing to find out more about the fishery resources in the Gulf of Mexico and adjacent waters has been conducted since 1950 by the U. S. Fish and Wildlife Service. Observations of surface tuna from the Service's exploratory fishing vessel Oregon during 1950 and 1951 offshore operations indicated a potential commercial resource.

Exploratory tuna fishing began in 1952. Pacific Coast purse-seining and live-bait techniques were used until May 1954. Since that time, because results with those methods were inconclusive (Bullis and Captiva 1955), the Japanese method of tuna long-lining has been used. Results of long-line fishing from May 1954 through June 1955 are reviewed by Bullis and Captiva (1955). This report includes results of subsequent long-line cruises by the Oregon and an analysis of the environmental, geographical, and operational factors which have been experienced.



Fig. 1 - The M/V Oregon, a 100-foot West-coast combination-type fishing vessel engaged in exploratory fishing in the Gulf of Mexico and Caribbean Sea.

The common names of fishes are used throughout the text, and the scientific names and authority for each species are listed separately.

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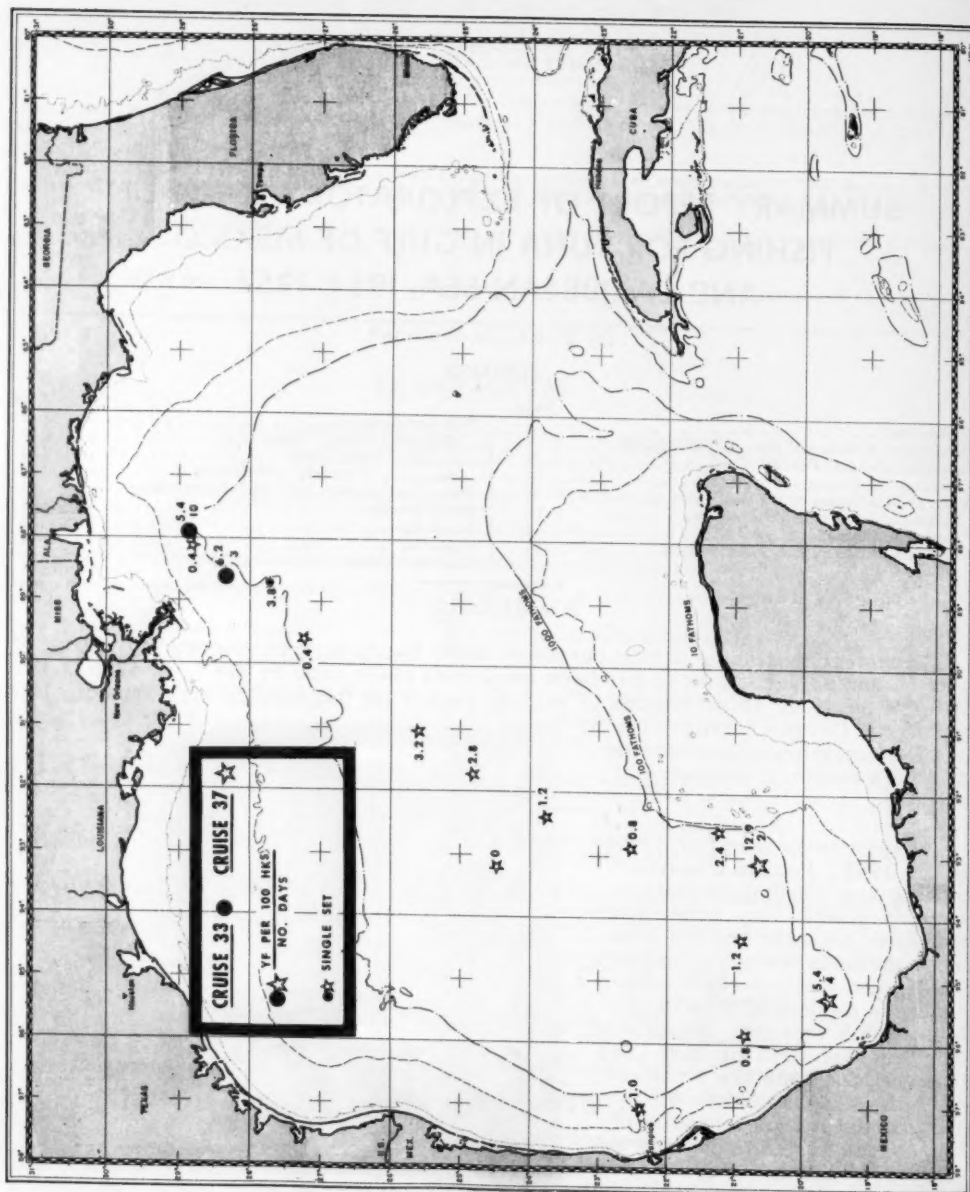


Fig. 2 - Locations and catch rates of the long-line sets on cruises 33 and 37.

## DESCRIPTION OF GEAR AND OPERATIONAL METHODS

A description of the long-line gear used by the U. S. Fish and Wildlife Service in the Gulf of Mexico is described in detail by Bullis and Captiva (1955) and is summarized as follows: One standard unit of gear, called a basket, is composed of 138 fathoms of mainline and ten 4-fathom branch lines attached to the mainline at 12-fathom intervals. The first and last branch lines are 15 fathoms from the ends of the mainline. The most important modification to the gear used in the Gulf in recent years was the change of mainline fiber from cotton and manila to nylon. Experiments aboard the Oregon demonstrated that nylon was superior from both operational and efficiency viewpoints.

The gear is fished by joining baskets end to end and suspending them below the surface with a buoy and a buoy line (usually 10 or 20 fathoms long) at each junction of the baskets. The entire operation is termed a set.

Setting the gear is usually started before dawn and completed from one to two hours later. Hauling ordinarily commences from nine o'clock to noon and is completed from 3 to 7 hours later, depending on the amount of gear fished. Specific details of the time involved in the setting and hauling operations of four cruises are given in appendix tables 20 through 23.

## COMMERCIAL-SCALE FISHING

Results of the initial long-line fishing by the Oregon indicated the existence of a possible commercial long-line fishery for yellowfin tuna in the Gulf. In August 1955, a program incorporating commercial-scale fishing into the long-line exploratory program was initiated. Three cruises (Nos. 33, 37, and 41)<sup>1</sup> in the Gulf have been carried out on this basis. The primary objective of this phase of the tuna program was to demonstrate whether a profitable long-line operation for yellowfin tuna could be conducted by United States fishermen in the Gulf of Mexico.

On the basis of the previous work in the Gulf and Central Pacific (Iversen and Murphy 1955), it was decided that daily fishing of 100 baskets (1,000 hooks) constituted a commercial-scale effort.

Table 1 - Yellowfin Catch Rates for Commercial-Scale Long-Line Cruises

Cruise Number	Days at Sea	Fishing Days	Number of Hooks Fished	Tons Caught	Tons Per Day at Sea	Tons Per Fishing Day	Average Catch Rate (No. of Fish/100 Hooks)	Catch Rate Range (No. of Fish/100 Hooks)
33	1/15	14	12870	29.5	1.96	2.1	5.0	1.7-11.2
37	2/23	16	10030	26	1.1	1.6	4.4	0-12.9
41	25	18	13400	35	1.4	1.9	4.5	0.2-9.6

<sup>1</sup>/Cruise 33 - Days at sea do not include 1 day taken in middle of trip to return to Pascagoula for unloading.  
<sup>2</sup>/Cruise 37 - Days at sea do not include days taken for port call at Brownsville, Tex.

Data on yellowfin tuna catches for the three cruises in the Gulf devoted to commercial-scale long-lining are summarized in table 1. Locations and yellowfin tuna catch rates of the long-line sets on cruises 33 and 37 are presented in figure 2 and for cruise 41 in figure 3.

Of the three cruises, only cruise 33 was in an area and during a season when yellowfin were known to exist in possible commercial concentrations. Cruises 37 and 41 were carried out during seasons and in areas not previously explored; consequently, a good part of the time was spent locating fish. For example, cruise 37 took a total of 26 tons in 16 fishing days, 12½ tons of which were taken the last two fishing days of the trip. Although cruises 37 and 41 include results of a considerable number of poor exploratory sets, the total catches for the periods fished are of a magnitude considered commercially profitable for a Gulf of Mexico operation.

<sup>1</sup>/Cruise 33 was in the north Gulf during August 1955; Cruise 37 was in the central and south Gulf during March and April 1956; and Cruise 41 was in the north and south Gulf during November and December 1956.

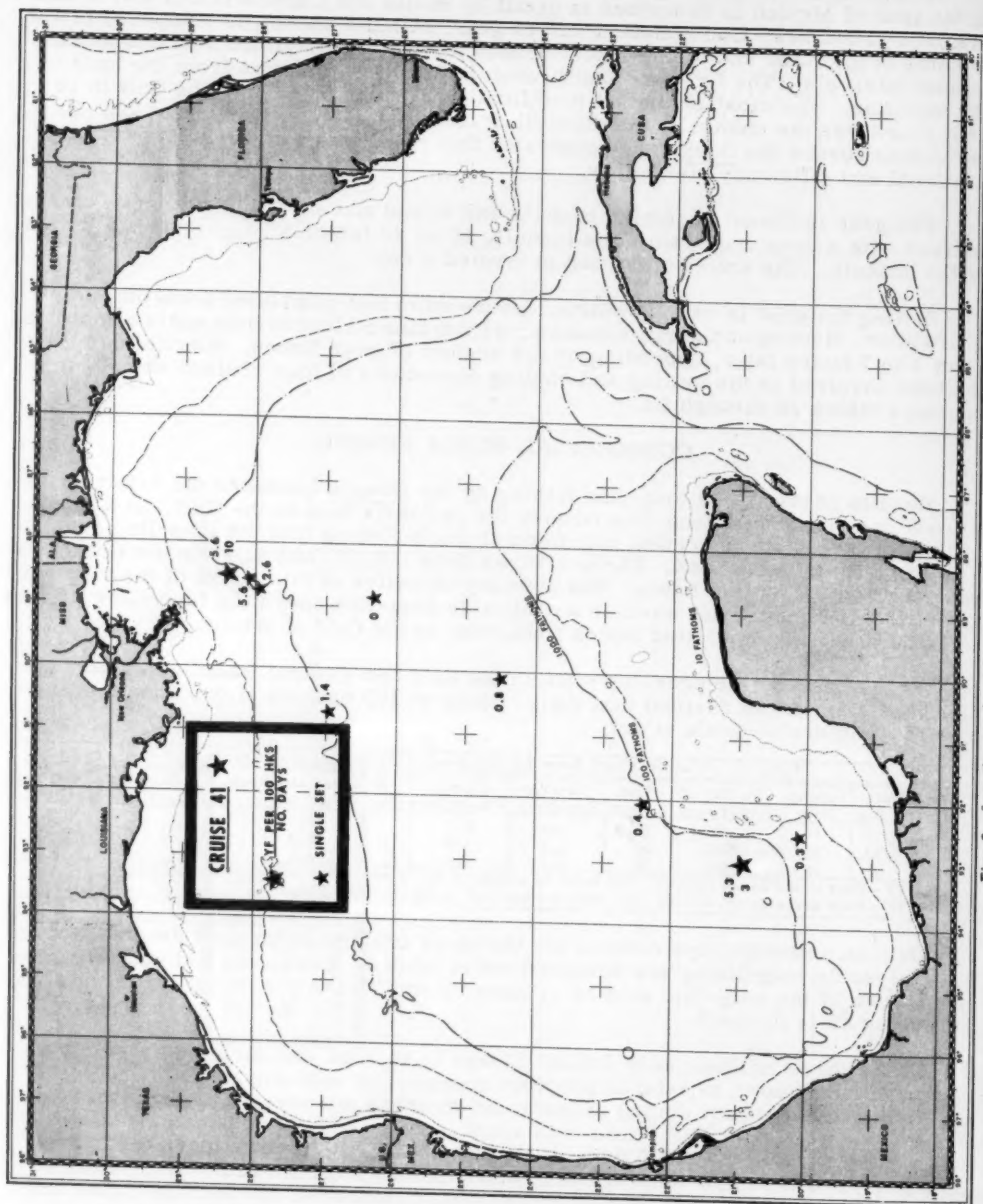


Fig. 3 - Locations and catch rates of the long-line sets on cruise 41.

The tons per day away from port (1.1, 1.9, 1.4) taken on these cruises compare favorably with that averaged by 50- to 100-ton capacity West Coast live-bait tuna vessels (Shimada and Schaefer 1956). It is indicated that vessels of that size are desirable for Gulf operations.

Early attempts by commercial vessels to exploit the yellowfin stocks in the Gulf were handicapped by the absence of a local market for their catches. From September 1954 to December 1956, six vessels were engaged sporadically in long-line fishing with limited amounts of gear. They were, however, forced to discontinue fishing because the cost of shipping the catches to either the West Coast or Puerto Rico for canning made the operation unprofitable. In February 1957, a local canner began accepting some fish for experimental packing and has subsequently contracted to take the fish of four vessels. Another local canner has contracted to purchase the fish of still another vessel. Of the five vessels presently operating, three are converted World War II subchasers, one a converted minesweeper, and the fifth a Pacific Coast sardine purse seiner.

Daily records of fishing effort and catches are available from only the commercial M/V Alfhild. Since May 1957, when this vessel began long-line operations, it landed 88 tons of yellowfin from 65 sets of which only 15 sets were of 90 baskets or more. Although the catch for the period (May-November) is poor, the catch per fishing day (1.4 tons) is fair and the potential is good considering the vessel fished only about half the amount of gear it is capable of operating. The total catches of the other vessels has been slightly less than the Alfhild's, but their daily effort has also been considerably below their capabilities.

It is believed that as areas and seasons of high productivity are more precisely delineated, over-all catches can be materially increased.

#### CARIBBEAN EXPLORATIONS

A series of four cruises planned to determine the extent of subsurface tunas in the northern, western, and eastern Caribbean and to gain information on the possible continuity of yellowfin tuna stocks between the Gulf and these areas available to long lines commenced with cruise 30 during April and May 1955. During this cruise the northern Caribbean region from Hispaniola to Yucatan Channel was explored. The location of each long-line set of the Oregon in the Caribbean is shown in figure 4.

Seven 42-basket sets were made east and north of Jamaica. All of these sets took yellowfin at catch rates from 1 to 2.6 fish per 100 hooks and from one to six 50- to 60-pound albacore per set were also taken. Eight bluefin tuna weighing from 400 to 800 pounds each were taken on two of these sets at the head of Windward Passage, and approximately an equal number were lost due to gear failure. Between the western end of Jamaica and Yucatan Channel four sets caught no yellowfin or albacore, although on each of two of these sets a single large bluefin was taken.

The second of this series of cruises--cruise 35--in January 1956, extended from southeast of Puerto Rico through the north-central Caribbean to Yucatan Channel. Four sets averaging 920 hooks each, from St. Croix to a point south of central Hispaniola, caught yellowfin averaging 126 pounds at the rate of 0.6 fish per 100 hooks and albacore averaging 51 pounds at the rate of 0.4 fish per 100 hooks. Four sets from approximately 90 miles south of Jamaica to Yucatan Channel caught yellowfin at the rate of 0.3 fish per 100 hooks but no albacore.

During the third cruise--cruise 46--in August and September 1957, six 500-hook sets were made in the western Caribbean beyond the 1,000-fathom curve off the coasts of Nicaragua, Costa Rica, and Panama. Four of the sets caught yellowfin at rates of 2.0, 2.9, 4.6, and 6.9 fish per 100 hooks. Two sets further offshore took no tuna.



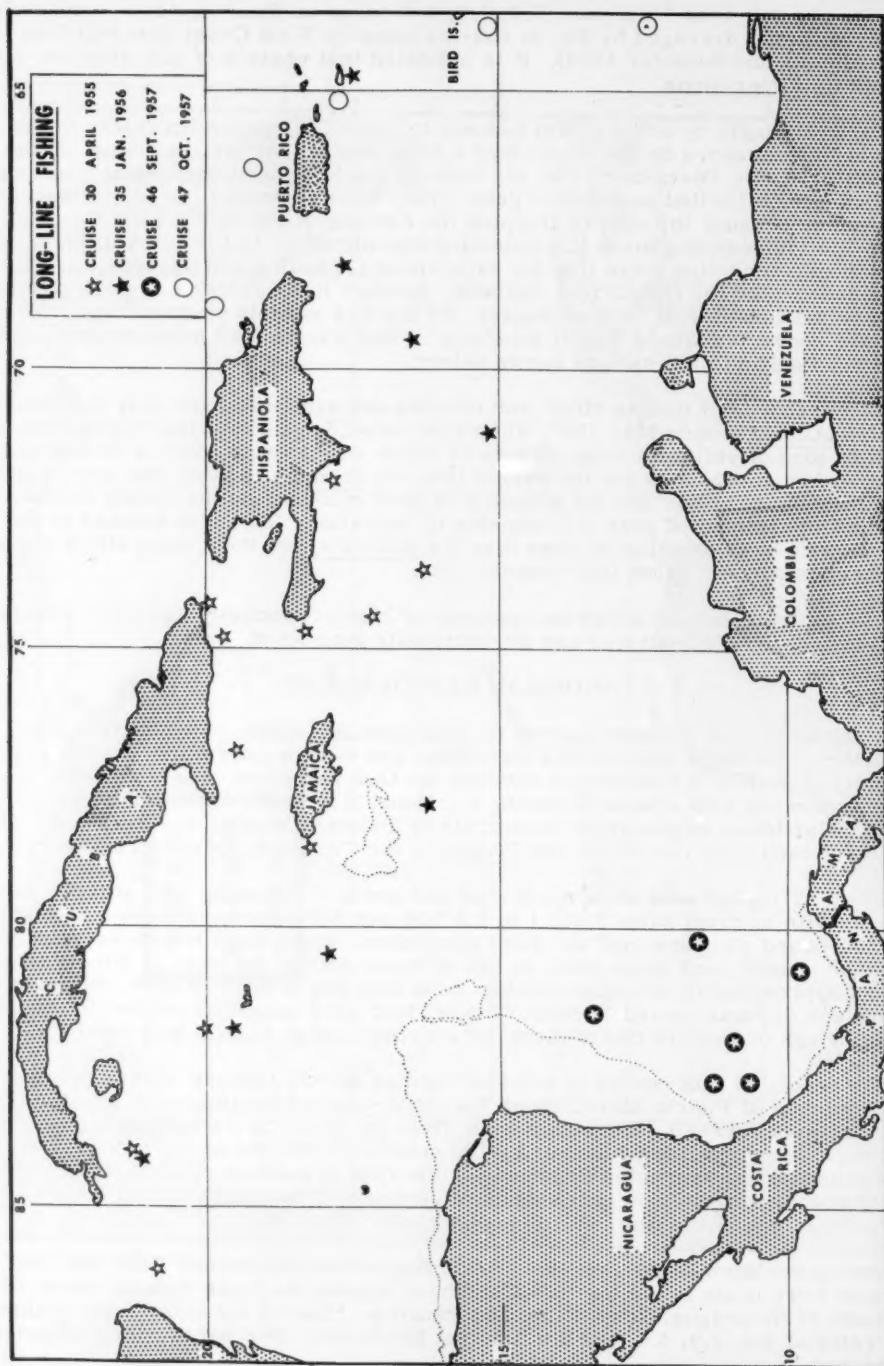


Fig. 4 - Locations of exploratory long-line sets in the Caribbean.

On cruise 47, the last of this series, in October 1957, a 500-hook set 40 miles southwest of Bird Island took 111 yellowfin for an average of 22.2 fish per 100 hooks and one 35-pound albacore. All yellowfin taken on this set ranged in size from 60 to 80 pounds each with the exception of one which weighed 125 pounds. During this cruise single sets were also made north of Hispaniola off Navidad Bank, north of Puerto Rico, between Puerto Rico and St. Croix, and 270 miles south of Bird Island. Catches on these 4 sets were uniformly poor, ranging from no yellowfin on the southernmost set to only 9 large yellowfin on the set north of Puerto Rico.

#### VERTICAL DISTRIBUTION OF THE GEAR

As pointed out by Murphy and Shomura (1953) it is of considerable commercial and biological importance to know at what depths the subsurface tunas are most abundant. Since the fishing level of the hooks is variable and affected by numerous factors, not all of which can be controlled, the problem of determining the absolute depth at which individual fish are taken is not any easy one.

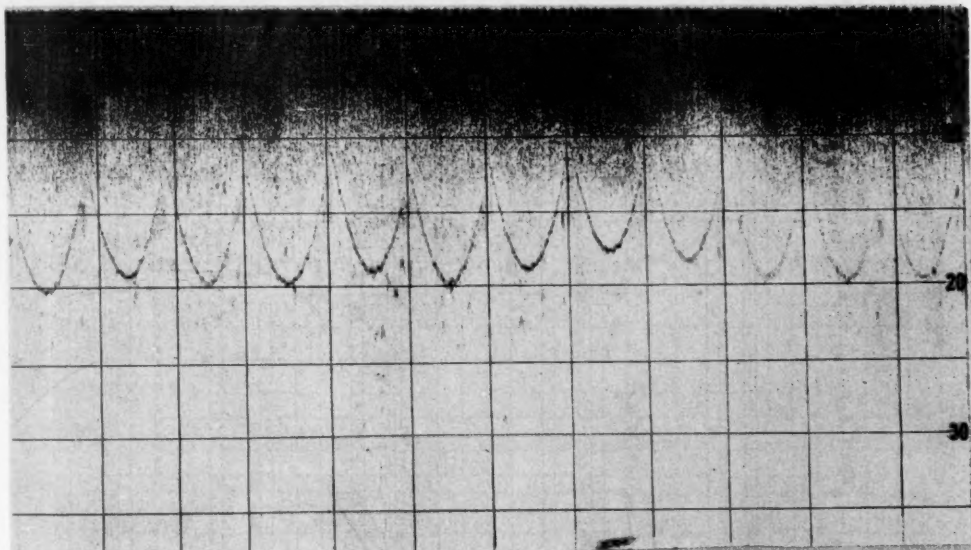


Fig. 5 - Depth-sounder tracing of a section of a long-line set. Depth scale is in fathoms.

The most reliable means for measuring the depth of the gear has been the depth-sounder. A depth-sounder tracing of a section of an Oregon long-line station is shown in figure 5. Figures 6 and 7 are diagrammatic representations of certain stations where tracings were obtained showing the depth to which the center of the mainline had sagged. The value of the depth-sounder in determining the depth of a basket on which a yellowfin is taken is somewhat limited. In many cases, the basket cannot be recorded because it has moved laterally out of the range of the signal. Frequently, the end baskets are too deep to be recorded, particularly on rough days, and in some instances the basket is recorded only after the fish has pulled it out of its original position.

Factors which determine the depth of the gear are: construction of the basket, amount of slack allowed while setting, normal sagging of the baskets on either end of the set, and effects of current and wind. Construction of the gear affects the fishing depth in that the longer the mainline the deeper it can be made to sag. The longer the buoy lines from which the mainline is suspended, the deeper the basket will

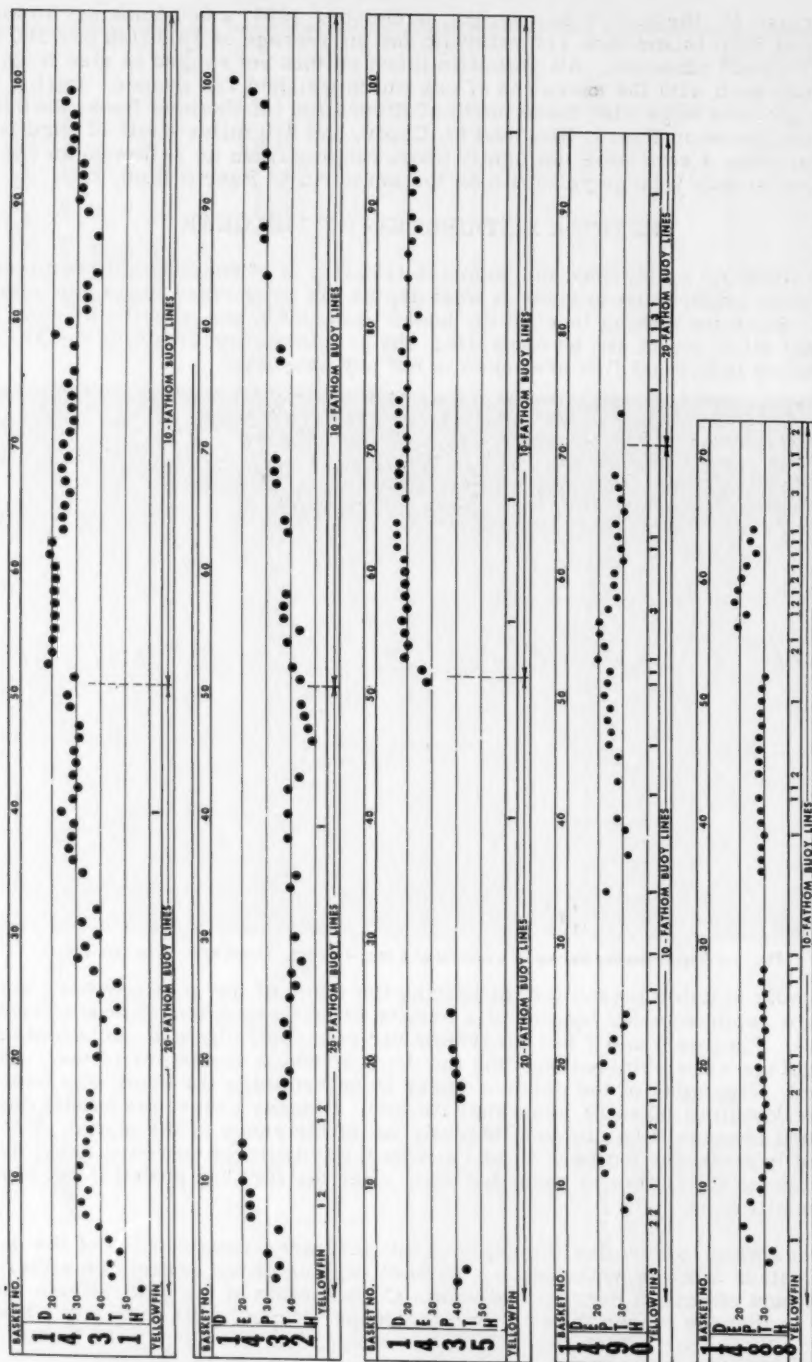


Fig. 6 - Diagrammatic presentation of depth-sounder records of individual baskets of long-line gear for M/V Oregon stations 1431, 1432, 1435, 1490, and 1488. The bottom edge of the symbol indicates the depth of the center of the basket of gear. Only the baskets of gear recorded by the depth-sounder are shown.

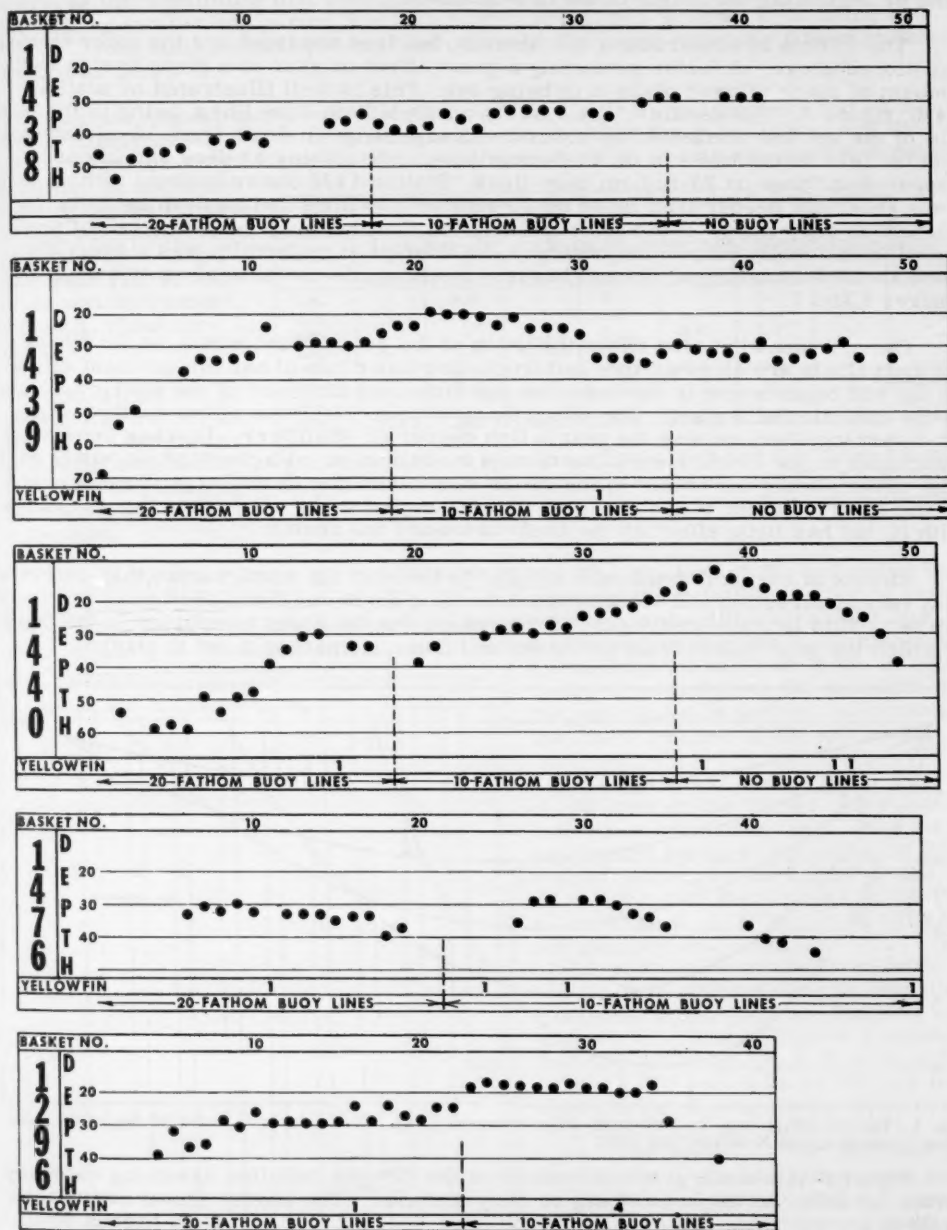


Fig. 7 - Diagrammatic presentation of depth-sounder records of individual baskets of long-line gear for M/V Oregon stations 1438-1440, 1476, 1290, and 1490. The bottom edge of the symbol indicates the depth of the center of the basket of gear. Only the baskets of gear recorded by the depth-sounder are shown.

fish and the hooks can be made to fish shallower or deeper with respect to the main-line by regulating the length of the branch lines.

The effects of construction are obvious, but less apparent are the other factors mentioned above. A factor producing a great effect on gear of a given design is the amount of slack allowed while it is being set. This is well illustrated by station 1440, figure 7. The depths of the baskets on 10-fathom buoy lines, being in the middle of the set and unaffected by normal end sag, range in depth from 18-40 fathoms. Station 1476 shows baskets on 10-fathom buoy lines fishing as deep and in cases deeper than those on 20-fathom buoy lines. Station 1439 shows baskets without buoy lines generally deeper than those on 10-fathom buoy lines and as deep as those on 20-fathom buoy lines. It should be pointed out that these variations were not produced intentionally but, on the contrary, an attempt at uniformity was made. The normal deeper sagging of the end baskets is also quite variable as is evident from figures 6 and 7.

Current and wind also affect the depth of the gear. Wind action on the floats (Oregon floats are aircraft-tire and truck-tire inner tubes) has the greatest effect on the end baskets and is dependent on the force and direction of the wind in relation to the direction of the set. The effect being to push the buoys either farther apart or closer together, causing the gear to fish deeper or shallower. This has been most noticeable on the end retrieved last of sets made into, or with the wind, on windy days. The effect toward the center of the set is minimized due to the large drag imposed by the many adjacent baskets. Wind at right angles to the set pushes the end buoys with it, but has little effect on the baskets toward the center.

Effects of current or tide are similar to those of the wind, except that currents may vary in direction and velocity from depth to depth and from section to section of the set. This is undoubtedly part of the reason for the great variability in the depth at which the gear fishes from set to set and from one part of a set to another.

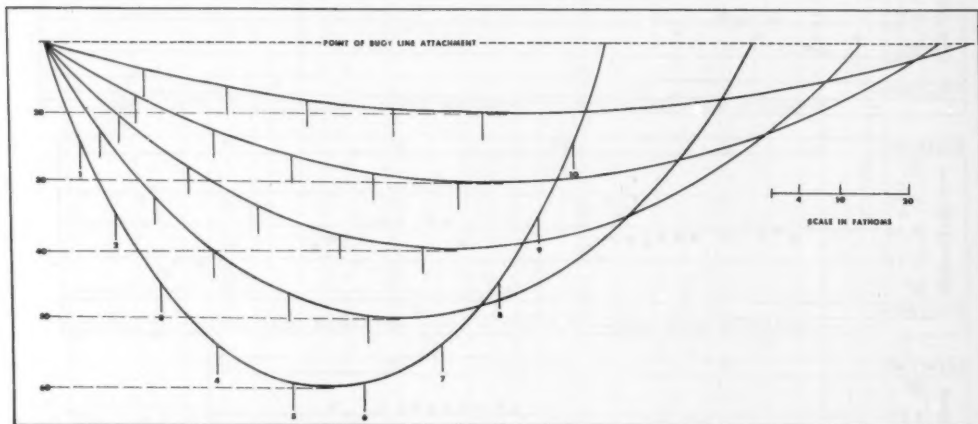


Fig. 8 - The 138-fathom long-line basket with different degrees of sag. The depths shown on the left assume the main-line is suspended from 10-fathom buoy lines.

Figure 8 is a scale graph of baskets of the Oregon mainline assuming catenary forms for different degrees of sag or buoy distance. The depths shown assume the baskets are suspended from a 10-fathom buoy line. The four-fathom branch lines are shown to give a comparison of fishing depths between hooks of similar position on baskets with different degrees of sag. It is of interest to note that deep-fishing hooks (5 and 6) of a basket at 20 fathoms are fishing shallower than the shallow-fishing hooks (1, 2, 9, 10) of a basket at 40 fathoms.



Another complicating factor in determination of optimum fishing depth for yellowfin is the possibility that baskets fishing at greater depths take yellowfin during the setting and hauling period, i.e., while they are either settling to or being retrieved from their normal fishing depth through the range normally fished by the shallower gear.

Considering the many variables acting sometimes simultaneously and sometimes independently which determine the depth at which the gear fishes, and the actual behavior as shown by the depth-sounder tracings, it was apparent that determination of optimum fishing depths for yellowfin within the range of the Oregon long-line gear (18-50 fathoms) was extremely difficult, if not impossible.

On cruise 40 in the northern Gulf, an attempt to determine yellowfin availability at greater depths was made. Table 2 shows the catch rates for the different length buoy lines. This limited trial suggests that the 18-50 fathom range normally fished is the most practicable from a production and operational viewpoint.

Station Number	Catch Rate--No. of Fish Per 100 Hooks--with Varied Buoy-Line Lengths							
	Surface	10 Fathoms	20 Fathoms	30 Fathoms	70 Fathoms	100 Fathoms	150 Fathoms	200 Fathoms
1582	-	4.4	-	4.1	-	1.3	-	-
1584	-	-	4.5	8.7	4.4	3.0	0.0	0.0
1586	2.2	-	1.1	0.0	0.0	2.7	-	-
1588	-	3.6	2.5	0.0	-	0.0	-	-
1590	-	5.4	6.5	4.0	2.2	0.0	-	0.0
1594	-	3.6	1.0	-	-	-	-	-
Average Rate	2.2	4.2	3.1	3.4	2.2	1.4	0.0	0.0

**YELLOWFIN CATCH BY HOOK POSITION:** The position of the individual hook on the basket, figure 9, has considerable influence on the relative number of yellowfin caught. Data from the Gulf operations suggests that the differences are due, at least in part, to "mainline interference." Since the end hooks fish much closer to the mainline than those in the middle, figure 9, aversion to the mainline by the tuna might be part of the reason for the lower catches of the end hooks.

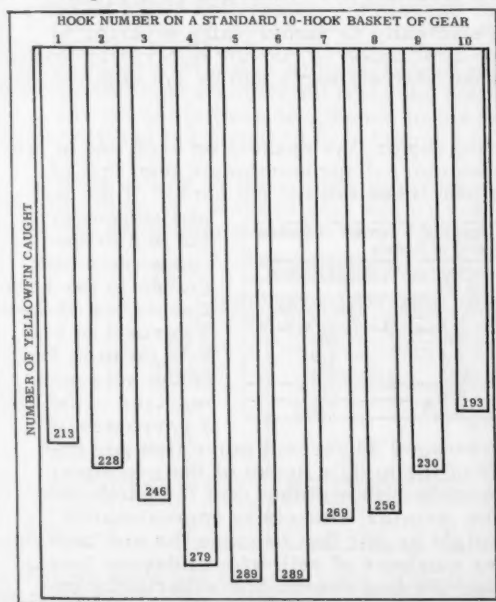


Fig. 9 - Number of yellowfin taken on standard gear by hook number. All cruises except 40.

of the basket would result in a considerable economic gain.

The yellowfin catch by the position of the hook on the basket is tabulated by individual cruises in table 18 of the appendix and summarized in figure 9. The higher catches by the center hooks is consistent with the findings in the Pacific by the U. S. Fish and Wildlife Service (Murphy and Shomura, 1953, 1954, 1955), and the Japanese (Yoshihara 1954). It is obvious that the long-line basket as a unit does not function with uniform efficiency. Figure 9 reveals that the end hooks (1, 2, 3, 8, 9, and 10) caught 1,366 yellowfin or 228 per hook, whereas the middle hooks (4, 5, 6, and 7) caught 1,126 yellowfin or 281 per hook. The average catch per hook of the middle hooks is 23.2 percent greater than that of the end hooks. Accordingly, if all hooks had fished at the rate of the center hooks the over-all catch would have been 2,810 yellowfin, a 12.8-percent increase. It is apparent then that increasing the relative efficiency

It has been concluded (Shomura and Murphy 1955) that because the middle and end hooks of a basket fish at different relative levels, the differential distribution of the catch is a reflection of greater numbers of yellowfin at the deeper levels. Yoshihara (1954) suggests the same reason. Although the catch distribution by hook position in Gulf operations has been similar to that in the Pacific there are a number of indications in the data that the disproportionate catch is not fully explained by the relative fishing-depth theory. The explanation offered by Shomura and Murphy (1955) assumes that similar hook positions of all baskets are fishing at approximately the same level. As pointed out earlier, the assumption that any given hook position on different baskets reflects a similar fishing level is questionable. Another consideration is the comparative slight difference in fishing depth of adjacent hooks of Oregon long-line gear. As indicated by figure 9, the difference of depth of the two end hooks (1 and 2 or 9 and 10) is approximately six fathoms. Because of this, little difference would be expected between the catch of these hooks. Figure 9 reveals that the catch of hooks 2 and 9 was 12.8 percent, larger than that of hooks 1 and 10. A difference of this magnitude between hooks with a vertical difference of only six fathoms would appear to be related to something other than only the depth differential. Another relationship which contradicts the depth theory is the comparative catch between the end hooks (1 and 10). Again, assuming that the two hooks fish the same level at all times, the catch should be approximately equal. However, figure 9 shows hook number 1 took 10.4 percent more yellowfin than hook number 10.

The discrepancy between the catch of hooks on either end of the basket is tentatively attributed to the action of current on the branch line. If a set is made parallel to the current then the branch lines on the end of the basket toward the source of the current would be streamed toward the mainline and those on the other end away from it.

A final consideration refers again to the extreme variability of the fishing level of the baskets. Since end hooks of some baskets at times fish as deep and deeper than intermediate and center hooks of other baskets the expectation would be for a more uniform distribution if yellowfin were actually as numerically superior at deeper levels as the pattern indicates. The conclusion is that the differential catch distribution by hook position in the Gulf is not entirely explained by the relative fishing-depth theory.

If mainline interference is a contributing factor, the baskets on each end of the set should display a distribution pattern even more disproportionate than that of figure 9 since they sag considerably more than those toward the center of the set

Cruise Number	Yellowfin Catch on			
	Terminal 5% of Baskets		Intermediate 90% of Baskets	
	Middle Hooks (4, 5, 6, 7)	End Hooks (1, 2, 3, 8, 9, 10)	Middle Hooks (4, 5, 6, 7)	End Hooks (1, 2, 3, 8, 9, 10)
33	51	40	252	299
37	20	29	141	179
41	46	57	213	293
Total Yellowfin Catch	117	126	606	771
Catch Per 100 Hooks	29.2	21	151.5	128.5

this. The middle hooks for these baskets averaged 39 percent more fish per hook than the end hooks, whereas the superiority of the middle hooks of the remaining baskets was only 17.9 percent. The data in table 3 show, also, that the catch rate of both the intermediate and end hooks of the terminal baskets is approximately twice that of the intermediate baskets. It might be felt that because the end baskets fish deeper the superiority is due to greater numbers of yellowfin at deeper levels. It does not seem reasonable, however, to ascribe this two-to-one superiority entirely to greater numbers of yellowfin at deeper levels for a number of reasons. The baskets on each end of the set fish deeper due to end sag but they also fish a

and consequently the end branch lines are much closer to the mainline. Data of the 5 percent of baskets on each end of the sets summarized in table 3 corroborate

larger volume of water per basket than the intermediate ones and therefore a larger catch per unit would be expected. For purposes of illustration consider the area exploited by a long-line set as shown in two dimensions in figure 10. The distances X, Y, and Z are dependent on the distances to which a yellowfin can detect the bait.

Theoretically all fish entering areas A and B are available to basket number 1 and equal areas are available to all other baskets. In addition to areas A and B, the end baskets have available to them the fish in areas C and D. This relationship is

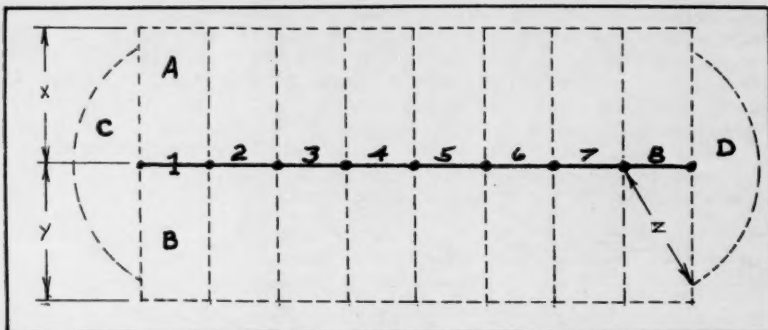


Fig. 10 - The theoretical areas fished by the baskets of a hypothetical 8-basket long-line set as viewed from above.

an extremely complex one, greatly simplified here, but does illustrate how baskets on the ends of sets would be expected to have higher catch rates than the intermediate ones. Another consideration connected with the much higher catch rates of the end (and deeper) baskets are the results of the experimental gear fished on cruise 40, table 2. Fishing to levels considerably below that of the standard Oregon gear did not increase the catch rate, but actually diminished it.

**GEAR MODIFICATIONS:** If mainline interference was a factor contributing to the lower catches of the endhooks, certain modifications to the gear might overcome this and consequently create a more efficient unit. On the basis of this, a limited experiment with modified baskets was conducted during cruises 45 and 47. The experimental baskets differed from the standard in that the two branch lines on each end of the mainline were lengthened to six fathoms--the six intermediate branch lines remained the standard four fathoms in length.

During cruise 45 three long-line sets were made. Seven experimental baskets were fished on two of these sets and five on the other. Standard baskets were alternated with experimental ones. Occasionally, however, two standard or experiment-

Table 4 - A Comparison of Catch Rates of Standard and Experimental Baskets during Cruises 45 and 47

Station	Long Branch-Line Baskets			Standard Branch-Line Baskets		
	No. Baskets Fished	No. Yellowfin Caught	Catch Rate	No. Baskets Fished	No. Yellowfin Caught	Catch Rate
Cruise 45:						
1845	7	15	21.4	7	7	10.0
1846	7	12	17.1	8	11	13.7
1847	5	18	36.0	10	13	13.0
Average Catch Rate (No. of fish/100 hooks)			24.8			12.2
Cruise 47:						
1978	6	12	20.0	9	10	11.1

al baskets were set consecutively. Consequently, to obtain as accurate a comparison as possible, the catches on all standard baskets which fished adjacent to an experimental one were used in the evaluation. As is shown in table 4, the average catch rate of the experimental gear was 103 percent greater than the standard. On

cruise 47 only one set took enough yellowfin to permit evaluation of the comparative effectiveness of the experimental gear. As shown in table 4 the experimental gear had an average catch rate 80 percent greater than the adjacent standard baskets.

Of interest at this point is a comparison of the relative distribution of the catch by hook position for the experimental and adjacent standard baskets for these sets. The end hooks of the experimental gear took 22 yellowfin when 40 percent of the total of 57 or 22.8 would be expected. The end hooks of the adjacent standard baskets caught 9 yellowfin, whereas 40 percent of the total of 41 or 16.4 would be expected. Further indication of the superior efficiency of the 6-fathom branch lines on the ends of the experimental baskets is the comparison of these hooks with the corresponding hooks of the adjacent standard baskets. On cruises 45 and 47 the 6-fathom branch lines had a catch rate of 21.0 tuna per 100 hooks and the corresponding branch lines of the adjacent baskets was 8.1 tuna per 100 hooks.

List of Common and Scientific Names of Species Mentioned in This Article

Common Names	Scientific Names
Yellowfin tuna . . . . .	<i>Thunnus albacares</i> (Bonnaterre)
Big-eyed tuna . . . . .	<i>Thunnus obesus</i> (Lowe)
Bluefin tuna . . . . .	<i>Thunnus thynnus</i> (Linnaeus)
Albacore . . . . .	<i>Thunnus alalunga</i> (Gmelin)
Blackfin tuna . . . . .	<i>Thunnus atlanticus</i> (Lesson)
Skipjack . . . . .	<i>Katsuwonus pelamis</i> (Linnaeus)
White-tipped shark . . . . .	<i>Pterolamiops longimanus</i> (Poey)
Silk shark . . . . .	<i>Eulamia floridanus</i> (Bigelow, Schroeder & Springer)
Mako shark . . . . .	<i>Isurus oxyrinchus</i> (Rafinesque)
White marlin . . . . .	<i>Makaira albida</i> (Poey)
Blue marlin . . . . .	<i>Makaira ampla</i> (Poey)
Sailfish . . . . .	<i>Istiophorus americanus</i> (Cuvier & Valenciennes)
Swordfish . . . . .	<i>Xiphias gladius</i> (Linnaeus)
Spearfish . . . . .	<i>Tetrapterus</i> sp.
Lancetfish . . . . .	<i>Alepisaurus ferox</i> (Lowe)
Cigarfish . . . . .	<i>Decapterus punctatus</i> (Agassiz)
Squid . . . . .	<i>Loligo peali</i> (Lesueur)
Herring . . . . .	<i>Etrumeus</i> sp.
Razorbelly . . . . .	<i>Harengula pensacolatae</i> (Goode & Bean)
Menhaden . . . . .	<i>Brevortia patronus</i> (Goode)
Croaker . . . . .	<i>Micropogon undulatus</i> (Linnaeus)
Mackerel . . . . .	<i>Scomber grex</i> (Mitchill)

If the increased catch of the experimental baskets was the result of a superiority of longer branch lines rather than a minimizing of mainline interference, then the 6-fathom branch lines should have a markedly higher catch rate than the remaining branch lines of the same basket. On cruises 45 and 47 the catch rate of the long branch lines was 22.2 tuna and the standard branch lines 21.5 tuna. This is consistent with the findings of Shomura and Murphy (1955) who have compared the efficiency of long and short branch lines and found no significant differences.

Quite obviously the large superiority of the experimental gear cannot be attributed to merely lengthening the four terminal branch lines when the intermediate branch lines of the same baskets were unchanged but yet caught approximately twice as many fish as the corresponding hooks of the adjacent gear. One reason which may contribute to this phenomenon is set forth by Shomura (1955)--the superiority of sardines over squid as long-line bait in moderate and rough seas, i.e., visibility. Shomura found that in calm seas there was no significant difference in the catches of the two baits, but in rough seas the sardines produced significantly larger catches. This was attributed to the silvery sardine being more visible to the tuna than the nearly translucent squid, particularly when rough seas caused the bait to move.



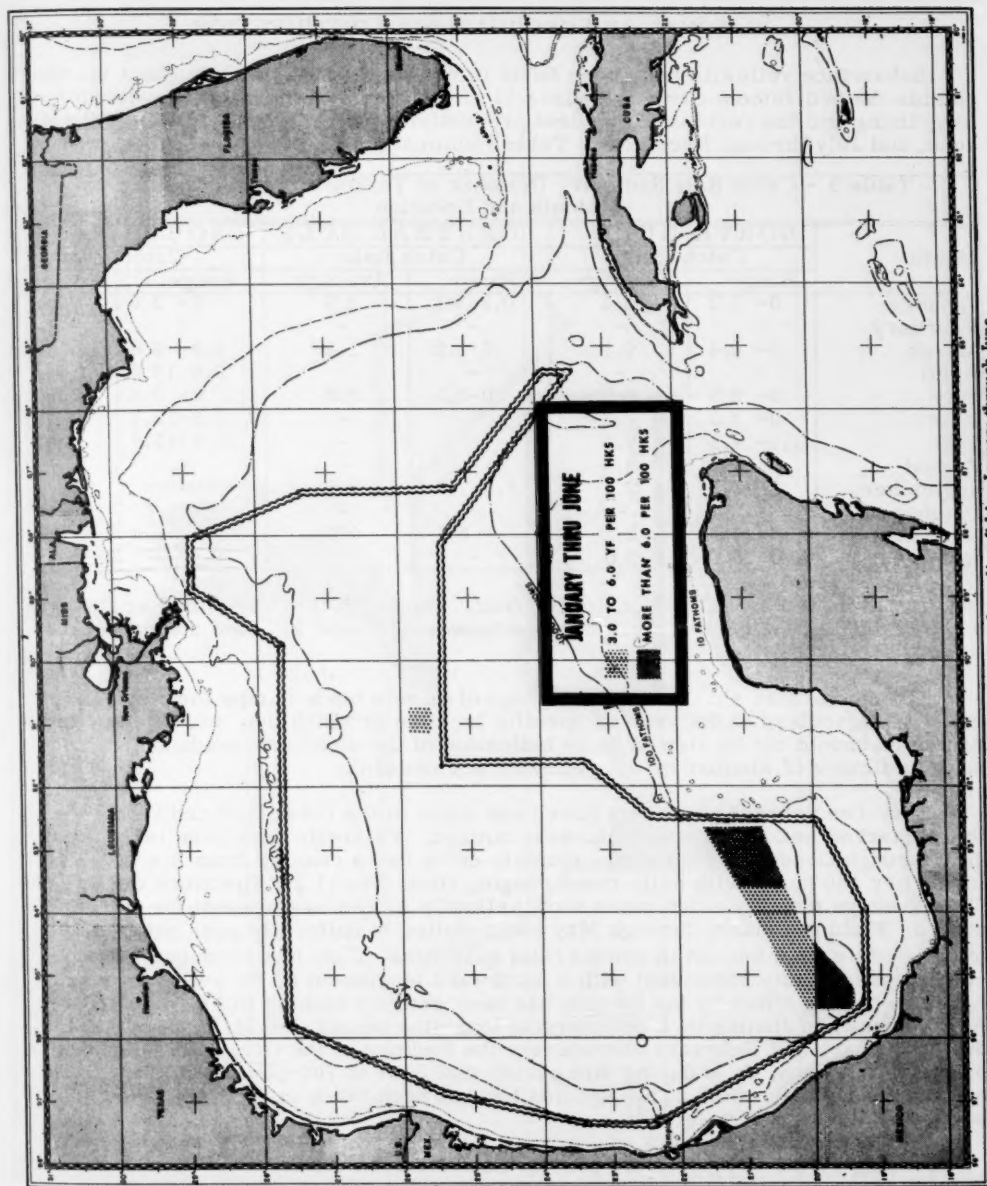


Fig. 11 - Area of exploratory long-line fishing January through June.



A similar effect may have been influencing the catches of the experimental gear during cruises 45 and 47. It is possible that higher catches on the long branch lines produced greater activity on the adjacent baits, making them more attractive to more fish and thereby increasing the catch of the entire basket.

#### SEASONAL AND GEOGRAPHICAL DISTRIBUTION

Subsurface yellowfin have been found in varying abundance throughout the Gulf outside the 500-fathom curve. Figures 11 and 12 depict the areas of exploratory long-lining and the regions of greatest productivity for the periods January through June, and July through December. Table 5 summarizes the catch rates experienced

Table 5 - Catch Rate Summary (Number of Yellowfin Per 100 Hooks) by Month and Location						
Month	NORTH GULF		CENTRAL GULF		SOUTH GULF	
	Catch Rate		Catch Rate		Catch Rate	
	Range	Average	Range	Average	Range	Average
January	0- 0.8	0.4	0.2-3.1	1.6	0- 2.6	0.8
February	-	-	-	-	-	-
March	0- 0.4	0.1	0-3.2	1.8	0.8- 6.8	3.8
April	-	-	-	-	0.8-12.9	5.2
May	0- 0.5	0.2	0-2.3	0.8	0- 3.8	1.0
June	0- 3.2	1.2	-	-	3.8-10.1	6.9
July	1.1- 4.1	2.7	-	-	13.6-15.6	14.7
August	0-11.2	3.4	-	-	-	-
September	0- 8.2	2.4	1.3-7.5	4.0	-	-
October	-	-	-	-	-	-
November	0- 6.6	2.4	0.5	0.5	0.3- 9.6	2.9
December	0- 8.6	3.0	-	-	-	-

monthly in three general regions of the Gulf. The north Gulf is defined as the area north of 27° N., the central Gulf the area between 23° and 27°, and the south Gulf the area south of 23° N.

The catch rates shown are the average of all sets made during the respective months, regardless of the year or specific location in which they were made, and therefore should not be viewed as an indication of the absolute abundance but rather as an indicator of whether or not yellowfin are present.

Sixty-two percent of all sets have been made in the north Gulf and it is here that a marked seasonal pattern has been noticed. Yellowfin have been taken from July through December at average monthly catch rates ranging from 2.4 to 3.4 yellowfin per 100 hooks with daily rates ranging from 0 to 11.2. The more or less uniform average monthly catch rates show yellowfin stocks are present for the entire period. Fishing January through May has resulted in uniformly poor catches. Yellowfin were caught but not in commercial quantities. June has produced better catches presumably coincident with a northward movement of the yellowfin stocks. Although fishing effort by the Oregon has been entirely lacking in February and April, results of fishing by a commercial long-line vessel, the M/V Mike Flechas, during January and February corroborate the findings of the Oregon in this area during this season. It is during this period that 300- to 700-pound bluefin tuna appear in the northern Gulf. This species has not been taken in the west, central, or south Gulf during any season.<sup>2/</sup>

Fishing by the Oregon in the central Gulf has been conducted primarily January through May and catch rates have been generally lower than either in the north or south Gulf. Fishing by the commercial long-liner Mike Flechas during February

<sup>2/</sup>Bluefin were later caught in the western Gulf by the commercial long-liner M/V Milmar in the early summer of 1958.

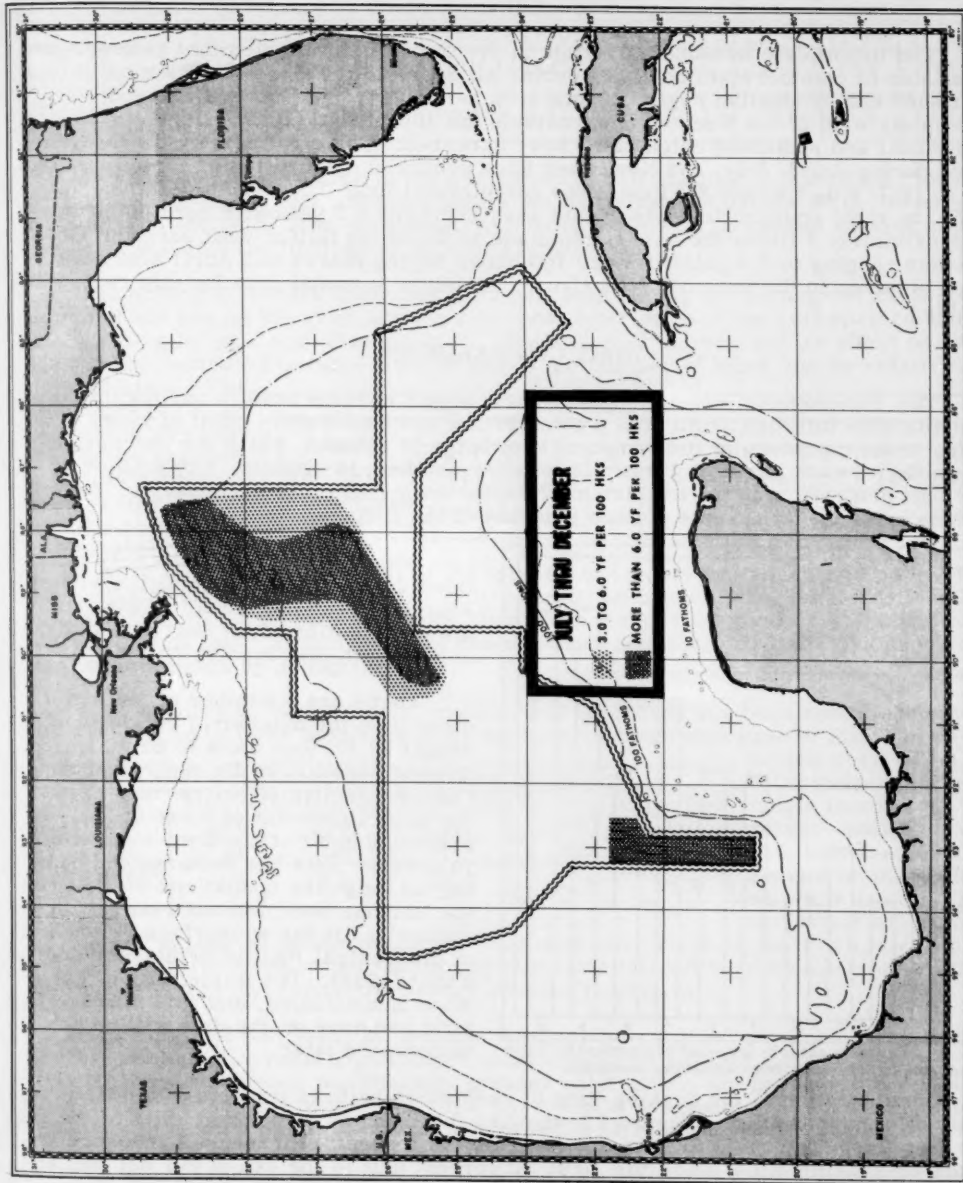


Fig. 12 - Area of exploratory long-line fishing July through December.

experienced substantially the same rates as the Oregon. However, the commercial long-liner Santo Antonino fishing in this area south of the Mississippi Delta during September experienced catch rates ranging from 1.3 to 7.5 tuna. Data from this area are not sufficiently comprehensive to reveal any seasonal presence of yellowfin.

The incomplete seasonal coverage in the south Gulf indicates that yellowfin are available in commercial quantities during all seasons of the year. The most intensely fished and productive region of this area has been in the Gulf of Campeche immediately west of the Yucatan Shelf outside the 100 fathom curve. Here, the highest individual and sustained catch rates have occurred. The eight sets by the Oregon here during April, July, and November have produced catch rates of 15.4, 14.9, 13.6, 12.9, 12.7, 9.6, 3.8, and 2.4 tuna. The commercial long-liner, Alfhild, during July 1957, on eight consecutive sets in this area averaged 8.3 yellowfin per 100 hooks--approximately 5 times the rate it had made in the north Gulf a week earlier. Good catches ranging to 7.6 yellowfin per 100 hooks during March and April also have been obtained in the area off Vera Cruz. Complete seasonal data for this region is lacking.

#### BAIT COMPARISONS

The comparative effectiveness of various bait species used in any fishery is of considerable interest, from both a commercial and exploratory point of view. The value to the commercial fisherman of knowledge of species, which for one reason or another result in either larger or smaller catches, is obvious. Cognizance of any bait preference in the evaluation of exploratory results is necessary in order to obtain the most accurate picture possible of the fishery.

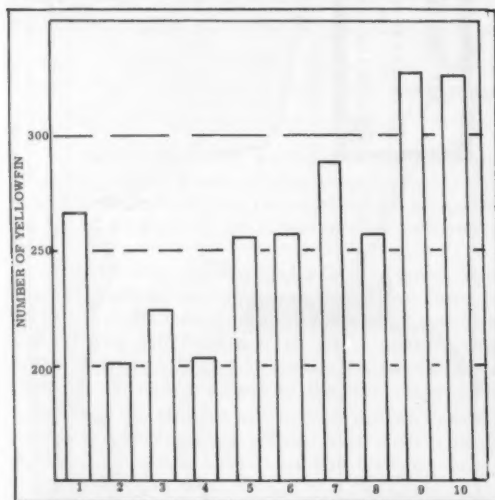


Fig. 13 - Yellowfin catch by long-line gear grouped as 10 percent units of 100-basket sets--all cruises combined.

Since yellowfin was the only tuna taken in commercial quantities with long-line gear in the Gulf of Mexico, the examination of the bait data is concerned with this species only.

There are a number of factors other than the number of yellowfin caught by various baits to be taken into consideration in the evaluation of their respective effectiveness. One of the most important of these is the schooling habit of the deep-swimming yellowfin. This has been noticed during all long-line operations of the Oregon and has been demonstrated mathematically for the subsurface yellowfin of the Central Pacific by Murphy and Elliot (1954). The misleading effect, when uncontrolled, that this characteristic can have on the data will be demonstrated later.

Consideration of the soaking time of respective baits is important in evaluating their effectiveness also. Figure 13, showing the catch by 10 percent units of the set verifies this. The breakdown of the catch in this manner represents a measure of catch by soaking time since the first 10 percent unit is the end of the set hauled first and consequently soaked the shortest time. The factor of schooling is important here also since it is obvious that regardless of how long a section of the gear is soaked, the catch rate will be low if comparatively few schools happen to come in

contact with it. This has been evident on numerous sets, but since the chances are greater for schools to locate gear soaked for longer rather than shorter periods, the soaking time is a factor of importance.

Table 6 - Bait Loss by 10-Percent Units of Long-Line Sets - Cruise 37

	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100
No. of Baits Lost	222	221	233	203	234	230	246	238	263	331
Percentage Baits Lost	9.2	9.1	9.6	8.4	9.7	9.5	10.1	9.8	10.9	13.7

Another important factor in the evaluation of bait species is that of bait loss during the soaking period. Table 6 shows the bait losses of cruise 37 by 10-percent units of the sets. The progressive loss of baits with increased soaking time is consistent with the findings of Shomura (1955).

The principal factors contributing to bait loss during the fishing period are the action of the sea on the gear, the physical characteristics of the bait species and bait stealing by tuna and other species. The action of the sea and its effect on bait loss is demonstrated in table 7 which shows the number of baits lost by relative hook position. The end hooks (1, 2, 9, 10), which are subject to the greatest agitation from surface swells acting on the floats (Shomura 1955), lost

Baits	Table 7 - Bait Loss by Hook Position									
	Hook Number									
	1	2	3	4	5	6	7	8	9	10
No. Lost	317	256	254	213	201	205	198	227	245	245
Percentage Lost	13.4	10.8	10.7	9.0	8.5	8.7	8.4	9.6	10.4	10.4

1,063 baits when only 40 percent of the total or 944 would be expected to be lost had the action of the swells been uniform throughout the basket, whereas hooks 5 and 6 (the center hooks) lost only 406 baits when 20 percent of the total or 472 would be expected to be lost. Shomura (1955) has demonstrated that this bait-loss problem can be minimized by double-hooking.

Bait stealing by tuna, sharks, marlin, and lancetfish has been established by the baits found in their stomachs after capture. An extreme case of this was revealed when seven

Table 8 - Percentage Bait Loss by Species					
Baits	Mullet	Menhaden	Mackerel	Herring	Cigarfish
No. Used	551	510	3,220	1,790	2,140
No. Lost	51	94	793	482	604
Percentage Lost	9.3	18.4	24.6	26.9	28.2

baits were found in a single lancetfish. The relative ability of various bait species to remain on the hook is shown in table 8. The variations are consid-

erable and appear to be due to the physical characteristics of the fish, i.e., the tougher, smaller-eyed, wider-headed species (mullet) suffered smaller losses than the tender, large-eyed, narrow-headed species (cigarfish).

The factor of bait loss, as demonstrated for herring and sardines by Shomura (1955), is of considerable significance, particularly in rougher seas, where one species may experience significantly greater catch rates, not because there is a preference on the part of the yellowfin, but because one species has a much greater tendency to remain on the hook and consequently is available where others may not be. Double-hooking will minimize this discrepancy.

The factors previously mentioned which may give rise to erroneous conclusions, i.e., the schooling behavior of subsurface yellowfin and the soaking time may be controlled by alternating by basket or hook the species being tested.



**MENHADEN VERSUS CROAKER:** Two bait species readily available in the Gulf of Mexico, menhaden and croaker, were utilized primarily on cruise 41. Comparison of the over-all catch rates with the two species, eliminating stations where no yellowfin were taken, shows the apparent superiority of menhaden, as menhaden caught 5.1 yellowfin per 100 hooks and croaker 2.6 yellowfin per 100 hooks. Comparison of the catch rates using only those stations where both baits were used again shows a preference, but to a lesser degree, for menhaden. Menhaden caught 4.1 and croaker 2.6 fish per 100 hooks. If, however, only the data where the baits were alternated are considered (to minimize the effects of schooling behavior and soaking time), the resultant rates are menhaden 3.8 and croaker 3.1.

During cruise 41, for the first time, commercial long-line vessels were operating with the Oregon. Table 9 summarizes the data for those Oregon stations where

Station	M/V Oregon		M/V Milmar	
	Bait Used	Catch Rate	Bait Used	Catch Rate
1613	Menhaden	6.0	Croaker	2.3
1615	Menhaden	8.6	Croaker	2.5
1617	Menhaden	5.2	Menhaden	6.0
1619	Menhaden	3.8	Menhaden	5.5
1621	Menhaden	7.7	Menhaden	3.0

the M/V Milmar was fishing in the same area. The comparison of the rates of the two vessels for stations 1612, 1613, and 1615 indicates a striking preference for menhaden and is apparently confirmed by sta-

tions 1617 and 1618 where the Milmar catch rate increased considerably coincident with the change of bait from croaker to menhaden. However, it should be noted that the Oregon catch rate for these two stations using the same bait (menhaden) dropped considerably and on station 1621 picked up again, whereas the Milmar catch rate, still using menhaden, dropped, indicating something other than a bait preference influencing the catches. The construction of the gear fished by both vessels was identical, sea conditions were the same, and the soaking time of the gear approximately equal which suggests that catch-rate differences were in part the result of chance variation in the number or size of schools encountered by the gear of the respective vessels.

**CIGARFISH VERSUS SQUID:** The first two long-line cruises (23 and 24) of the Oregon employed principally cigarfish and squid as bait. The bait results for these

cruises are summarized in table 10. The combined data of the two cruises indicates an apparent strong preference on the part of the yellowfin for cigarfish as squid caught 0.6 yellowfin per 100 hooks and cigarfish 1.9 yellowfin per 100 hooks.

Using only the data where the baits were alternated reveals a rate of 1.1 yellowfin per 100 hooks for squid and 4.2 for cigarfish. Although the data do not lend themselves to mathematical analysis, in view of the magnitude

Station	Squid		Cigarfish	
	No. of Hooks Fished	Yellowfin Catch Rate	No. of Hooks Fished	Yellowfin Catch Rate
<b>Cruise 23:</b>				
1043	156	0.6	80	5.0
1053	170	0	60	4.5
1065	157	0	79	2.5
1067	182	0	54	1.9
1071	193	2.1	43	2.3
1073	210	0.5	26	0
<b>Cruise 24:</b>				
1111	135	2.2	137	1.5
1114	110	1.8	216	4.1
1120	113	0.9	168	0.6
1122	108	2.8	167	0
1123	99	0	312	0.3
1125	108	0	167	1.8
1126	108	0.9	176	0.6
1128	99	0	166	2.4
1129	99	0	171	2.3
1130	99	0	171	2.3
1133	151	0	151	0.7
1135	63	0	198	0.5
1138	54	0	248	3.6
<b>Average Rate for Both Cruises (No. of Fish/100 Hooks)</b>		<b>0.6</b>		<b>1.9</b>



of the difference and the comparatively large sample, it is concluded that cigarfish are superior to squid as long-line bait.

**MACKEREL, CIGARFISH, AND HERRING:** Comparisons of the relative effectiveness of these species on cruises 33 and 37 (table 11) is difficult due to the lack of a systematic distribution of baits throughout the sets.

Examination of the rates for those sets where these baits were used simultaneously reveals variations of considerable magnitude. However, observation of the distribution of baits for each station reveals in all cases a bias to the advantage of the bait with the highest catch rate. A good example of this is station 1488A, cruise

Table 11 - Comparative Catch Rates (Number of Yellowfin Per 100 Hooks) of Three Bait Species

Station	Mackerel		Cigarfish		Herring	
	No. of Hooks	Yellowfin Catch Rate	No. of Hooks	Yellowfin Catch Rate	No. of Hooks	Yellowfin Catch Rate
<b>Cruise 33:</b>						
1373.....	400	2.8	320	1.6	220	3.6
1375.....	250	1.6	470	2.8	280	1.8
1377.....	310	4.2	580	3.6	-	-
1379.....	440	5.2	570	6.0	-	-
1381.....	10	0	260	7.3	-	-
<b>Cruise 37:</b>						
1486.....	-	-	90	1.1	370	0.8
1488A.....	70	2.9	130	3.1	320	5.9
1488B.....	90	1.1	80	0	170	4.1
1490.....	20	5.0	580	2.5	90	3.3
1491.....	110	12.7	130	13.1	90	30.0
1493.....	350	15.1	190	11.6	80	12.5
Average Catch Rate Per 100 Hooks		5.06		4.8		7.7

37, table 11. In this case, herring has a rate (5.9) approximately twice that of mackerel (2.9) and cigarfish (3.1), but the distribution of the baits was such that the last baskets of the set with herring as bait accounted for 16 yellowfin, thus 20 percent of the gear accounted for 42 percent of the yellowfin taken. If the last 15 baskets are not considered and using only the data where the baits are more or less competitive, the catch rates for the three species are cigarfish 3.1, mackerel 2.9, and herring 2.9. In view of the consistency of this phenomenon on these cruises and pending experiments of a design lending to valid statistical analysis, the tentative conclusion is that these species are equally effective.

#### WATER TEMPERATURE AND CATCH RELATIONSHIP

Surface water temperatures exhibit a definite seasonal pattern with average monthly temperatures in the north Gulf generally a few degrees lower than those of the south Gulf. In both areas the temperature reaches a peak in July or August, with a gradual decrease until January or February and a gradual increase until summer.

Table 12 depicts the monthly surface temperature range for the north and south Gulf, with corresponding catch rates. In the northern Gulf the period from January through May shows a rise of temperature range from 69°-75° F. to 78°-80° F. and a uniformly low catch rate. During June, July, and August the temperature continues to rise as does the average catch rate. From August through December the temperature drops steadily but the average catch rate remains more or less con-

stant. In the south Gulf the data are very limited; however, it is also apparent that surface temperature and catch rate are not directly related in this area.

Table 12 - Surface Water Temperatures and Catch-Rate Relationship for the North and South Gulf

Month	North Gulf		South Gulf	
	Yellowfin Catch Rate	Temperature Range (°F.)	Yellowfin Catch Rate	Temperature Range (°F.)
January . . . . .	0.4	69-75	0.8	73-76
February . . . . .	-	-	-	-
March . . . . .	0.1	70-74	3.8	73-77
April . . . . .	-	80	5.2	76-78
May . . . . .	0.2	78-80	1.0	78-80
June . . . . .	1.2	78-82	6.9	-
July . . . . .	2.7	83-85	14.7	87
August . . . . .	3.4	79-85	-	-
September . . . . .	2.4	82-83	-	-
October . . . . .	-	83	-	-
November . . . . .	2.4	75-83	2.9	80-84
December . . . . .	3.0	75-76	-	-

Bathythermograph recordings of water temperatures to a depth of 450 feet have been obtained on most long-line stations. Table 13 is a tabulation of these data for the north Gulf for the months of August and December. The temperature range from a depth of 100 to 300 feet is given, since the information from depth-sounder trac-

Table 13 - Water Temperatures and Catch-Rate Relationship in the North Gulf, August and December

Station	Yellowfin Catch Rate	Surface Temperature (°F.)	Temperature (°F.) From 100 to 300 Ft.	Thermocline Depth (Ft.)
<u>August--Cruise 33:</u>				
1356 . . . . .	7.1	84	83-65	100
1360 . . . . .	8.9	85	83-66	130
1362 . . . . .	6.7	85	83-66	100
1364 . . . . .	6.7	85	80-67	90
1366 . . . . .	5.6	85	83-68	100
1368 . . . . .	4.4	85	82-65	100
1369 . . . . .	1.7	85	84-73	130
1371 . . . . .	1.9	79	82-67	100
1373 . . . . .	2.4	84	83-64	100
1375 . . . . .	2.2	85	84-65	100
1377 . . . . .	3.8	85	85-66	110
1379 . . . . .	5.7	80	77-60	130
1381 . . . . .	11.2	84	-	-
Average	5.2			
<u>December--Cruise 41:</u>				
1609 . . . . .	5.6	75	75-68	240
1610 . . . . .	8.4	75	75-69	250
1612 . . . . .	7.3	75	75-69	260
1615 . . . . .	7.5	75	75-69	250
1617 . . . . .	4.7	76	75-70	260
1619 . . . . .	3.8	76	75-71	250
1621 . . . . .	7.7	76	75-70	250
1622 . . . . .	5.3	75	75-69	210
1624 . . . . .	1/	75	75-69	210
1626 . . . . .	2.6	75	75-70	210
Average	5.9			

1/Not used in computing average catch rate since 3 vessels fishing this area on this day caught only one yellowfin.

tracings indicates this is the depth range within which the Oregon's standard gear fishes. The depth of the thermocline, the lower limit of the warmer surface layer, is also shown.

The maximum temperature range (19 degrees F.) observed within the fishing zone during the summer is much greater than the maximum winter range of 7 degrees F. Coincident with this relationship is the much deeper thermocline and a slightly higher average catch rate during the winter.

Table 14 - Water Temperature and Catch-Rate Relationship in the South Gulf, March-April and November

Station	Yellowfin Catch Rate	Surface Temperature (° F.)	Temperature (° F.) From 100 to 300 Ft.	Thermocline Depth (Ft.)
March-April--Cruise 37:				
1473 . . .	2.8	76	76-70	130
1474 . . .	1.0	74	74-68	200
1475 . . .	0	73	73-71	-
1476 . . .	0.8	74	74-75	-
1478 . . .	2.4	77	76-66	150
1480 . . .	1.2	76	75-73	330
1481 . . .	6.9	76	75-63	150
1482 . . .	7.6	76	75-62	150
1484 . . .	0.8	76	76-66	100
1486 . . .	1.0	77	76-73	300
1488 . . .	4.7	78	76-62	-
1490 . . .	3.4	77	77-61	100
1491 . . .	12.9	77	77-65	150
Average	4.2			
November--Cruise 41:				
1596 . . .	1.4	80	80-68	180
1597 . . .	0	83.5	83-74	210
1598 . . .	0.8	82	82-73	240
1599 . . .	0.4	84	84-78	225
1601 . . .	0.3	82	82-77	180
1603 . . .	9.8	82	82-71	180
1606 . . .	3.8	82	82-70	100
Average	2.3			

Table 14 summarizes the temperature data for the south Gulf during the months of November and March-April. Comparison of the two periods shows a temperature range of approximate equal width (12° F.) with the November range 6° F.-8° F. warmer. Again, coincident with the lower temperatures in the fishing zone, the average catch rate is somewhat higher. When the temperature within the 100- to 300-foot range has not fallen below 72° F., the catch rates have been low.

The available data neither establishes nor excludes the possibility that yellowfin in the Gulf inhabit an optimum temperature range and pending more precise information as to the absolute depth at which the fish are caught, this relationship cannot be further evaluated.

#### SHARK DAMAGE

The fraction of the total yellowfin catch damaged by sharks has varied from 4.2 percent on cruise 45 to 23.2 percent on cruise 24, and averaged 13.6 percent. Although approximately 50 percent of the damaged fish are acceptable for canning, shark damage constitutes a considerable economic loss to a commercial operation as seen in figure 14.

The relative severity of shark damage appears to be the result of a combination of factors. Iversen and Yoshida (1956) reported the degree of shark damage in Central Pacific long-line operations directly related to the magnitude of the shark catch. A similar relationship has been found in the Gulf of Mexico. This is particularly true when large shark catch rates are associated with high yellowfin catch rates. Environmental influence appears to be considerable also. Table 15 summarizes this information for the north and south Gulf. In the north Gulf a 10° F. drop of average surface water temperature from August to December is accompanied by a sharp drop in shark population as evidenced by the much lower shark catch rate. As would be expected, the percentage of damaged yellowfin dropped also. Shomura and Murphy (1955) pointed out that since the sharks taken on long-line gear are commonly seen at the surface, they are primarily a surface species. The indication then is that the 10° F. drop of surface water temperature in the northern Gulf creates an environment unfavorable to sharks. In the south Gulf a drop of surface temperature from 82° F. in December to 77° F. in March-April resulted in no significant changes in either shark catch or percentage of damaged yellowfin.

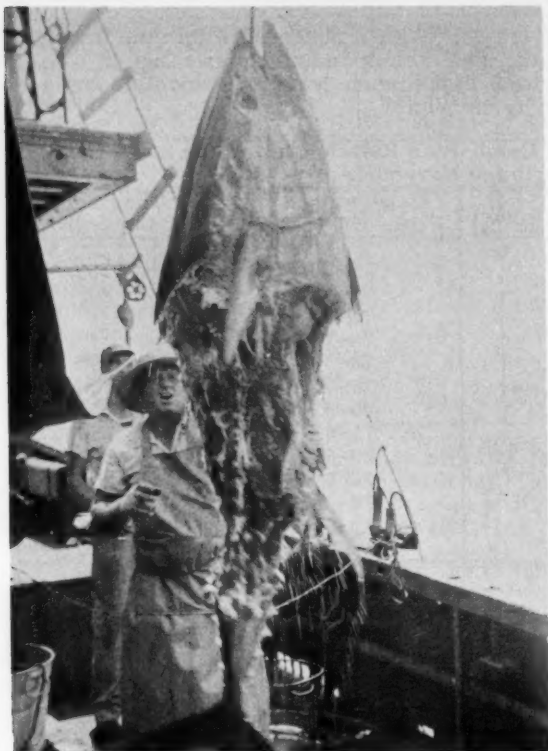


Fig. 14 - A shark-damaged bluefin tuna being brought aboard the vessel.

An important factor affecting the severity of shark damage is the time taken to haul the individual baskets. Shark damage occurs principally while the gear is being hauled and greater shark damage occurs with slow-hauling speeds. These data for four cruises are summarized in table 16. It is evident that the fraction of the catch damaged by sharks can be reduced by rapid and alert handling of the gear while hauling.

Table 15 - Shark Damage to Tuna Related to Shark Catch and Surface Water Temperatures							
North Gulf				South Gulf			
	Percentage of Yellowfin Damage	Shark Catch Rate	Average Surface Temp. °F.		Percentage of Yellowfin Damage	Shark Catch Rate	Average Surface Temp. °F.
Summer	21.2	1.5	85°	Winter	11.8	0.6	82°
Winter	8.6	0.6	75°	Spring	12.9	0.7	77°

The relationship between soaking time of the gear and the percentage of shark-damaged yellowfin is also shown in table 16. The larger damage rate with longer

soaking time indicates that damage occurs to some extent while the gear is soaking and not only during the hauling period.

Table 16 - The Relationship Between Hauling Time, Soaking Time, and Shark Damage

Cruise No.	Average Soaking Time (Minutes) <sup>1/</sup>	Percentage of Shark-Damaged Yellowfin	Hauling Time Per Basket (Minutes)
24. ....	10.2	23.2	4.5
33. ....	8.2	19.2	4.04
37. ....	7.8	12.8	3.2
41. ....	7.4	8.6	3.4

<sup>1/</sup>Computed by dividing the total soaking time of the set by the number of baskets fished.

### SUMMARY

1. Commercial-scale fishing on three trips produced quantities of yellowfin tuna of commercial magnitude.
2. Because of numerous factors affecting the vertical distribution of the long-line gear, determination of optimum depths of the subsurface yellowfin is difficult.
3. Yellowfin tuna catches were greater on the center hooks than on the end hooks of individual baskets. This disproportionate distribution was apparently rectified by employing longer branch lines on the ends of the baskets.
4. Yellowfin are present in commercial quantities in the north Gulf from July through December and apparently during all seasons in the south Gulf.
5. With the exception of squid, bait species were equally effective.
6. No relationship was noted between surface water temperatures and occurrence of yellowfin.
7. Shark damage to the catch is determined by the number of sharks in the fishing area and the speed with which the gear is hauled.

### APPENDIX

Detailed long-line stations list of the M/V Oregon and other detailed tables are not included here, but are available upon request as an appendix to the reprint of this article. Request Separate No. 545. The reprint, which contains the appendix, includes these tables:

Table 17 - M/V Oregon Long-Line Stations List.

Table 18 - Yellowfin Catch by Hook Position (Standard Gear).

Table 19 - Yellowfin Catch by 10-Percent Units of Set.

Table 20 - Time of Setting and Hauling Long-Line Gear, Cruise 33.

Table 21 - Time of Setting and Hauling Long-Line Gear, Cruise 37.

Table 22 - Time of Setting and Hauling Long-Line Gear, Cruise 41.

Table 23 - Time of Setting and Hauling Long-Line Gear, Cruise 45.

Table 24 - Shark Damage, Cruise 33.

Table 25 - Shark Damage, Cruise 37.

Table 26 - Shark Damage, Cruise 41.

Table 27 - Shark Damage, Cruise 45.



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## FISHING WITH UNDERWATER LIGHTS

An Italian Food and Agriculture Organization fisheries expert reports that he has successfully demonstrated to Tunisian fishermen that they can catch more fish with less wattage by setting their fishing lights beneath the water rather than above. He found fishermen using powerful petrol engines to generate power for a great number of surface lamps in their night fishing for sardines and anchovies. In Mahdia, one had 24 light bulbs of 500 watts each. Another had 16 and a third had 12. But most of the light from these lamps was wasted as it was reflected by the surface of the sea. The whole area was illuminated like a city square, but fishing results were poor. A different technique, using a 32-volt generating set and a 500-watt lamp placed under the water, was so successful in attracting fish that the local fishermen wanted to change their system so that they could use their lights underwater. Besides saving 50 percent in fuel costs, the underwater lights make for more effective fishing in rough seas and in strong moonlight. The submarine lamp is even more effective when used with an echo-sounder, which reduces waste of time because the fisherman can use it to make sure that worthwhile shoals of fish are present before he anchors his boat and switches his lights on (Current Affairs Bulletin of the Indo-Pacific Fisheries Council, November 1957).

## FISHERIES INSTRUMENTATION LABORATORY OFFERS BIOLOGISTS NEW RESEARCH "TOOLS"

By Richard H. vanHaagen\* and Harry P. Dale\*\*

A new and unique unit, the Fisheries Instrumentation Laboratory of the U. S. Bureau of Commercial Fisheries, has been established in Seattle, Wash., to assist fishery workers in making the most effective use of modern instrumentation and other physical science devices for their research problems.

Just completing its second year of operation, the Fisheries Instrumentation Laboratory is the only one of its kind which combines the talents of a team of biologists, engineers, electronic scientists, and instrument makers into a single unified group. By working together in the laboratory and in the field, biologists and



Fig. 1 - Electronic fishing with d. c. pulses provides improved sampling method in rivers and streams.

engineers are obtaining an understanding of each other's problems. This is materially increasing their combined effectiveness. As a result, new techniques, instruments, tools, and materials constantly being developed by the rapidly progressing physical sciences, are quickly adapted and utilized to the fullest extent in fishery research.

Services of the staff of the Fisheries Instrumentation Laboratory are available to all personnel of state, Federal, and private agencies who are contributing towards the advancement of fishery research and management.

The constantly increasing and damaging intrusion of modern civilization on one of our most valuable natural resources--fish and shellfish--has imposed a heavy

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burden on fishery scientists engaged in the conservation of this important protein source and recreational outlet. In many areas, increasing demands for water by industry, residential areas, irrigation, and hydroelectric installations have seriously depleted or altered the supply of available water for fish propagation and recreational purposes. In other areas, increased fishing pressure, pollution, silting, and a variety of changing environmental factors have seriously interfered with efforts to maintain commercial and sport fishing catches.

Overcoming these problems requires considerable expenditures of time, money, and manpower. Modern fishery workers are turning more and more to the powerful tools of physical instrumentation for data gathering and processing techniques.

The effective use of modern instrumentation has shown that substantial savings in time and money may be realized. Some investigations have saved considerable money by installing instrumentation and better data-handling facilities; others have used their saved manpower to work toward other aspects of their projects. Many have been able to accomplish tasks which would otherwise have been beyond their means, physically and financially.

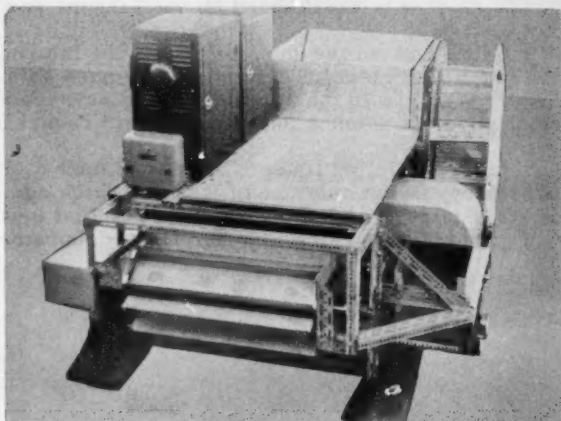


Fig. 2 - Tagged herring ejector examines up to two tons of herring a minute and removes individual fish containing a special internal tag.

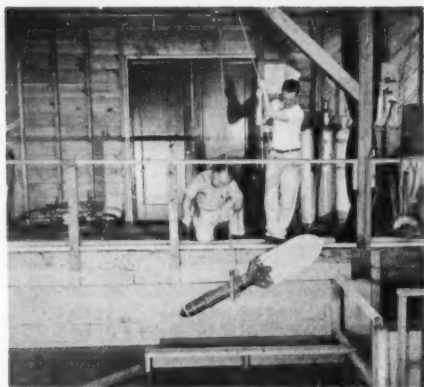


Fig. 3 - Improved model of current recorder provides permanent and accurate 90-day record of waterspeed and compass heading.

Caused in part by necessity, fishery research work is spread broadly throughout the country, and in very few places are facilities available to workers to develop new instruments or repair old ones except at great expense. A few universities and research units have allowed biologists access to their shop facilities. But even then, the problem of selecting the best materials or the most appropriate mechanism has been limited by the difficulty of communication between the biologist without engineering experience and the engineer or machinist with little awareness of the environmental problems of fishery biology.

Such a situation has long existed in the design of instruments for biological research, and has often led to many awkward and semi-satisfactory devices, cleverly conceived but inefficient in operation. Many satisfactory instruments are available, and need only to be brought to light.

The need for a unit with an understanding of the environmental problems of fishery biology and a knowledge of the proper technical assessment of contemplated instruments or systems of instruments is plainly evident.

The present staff of the recently-organized Fisheries Instrumentation Laboratory includes personnel trained and experienced in biology, physics, technical writing,

instrument making, and electronics. Gradual acquisition of precision tools and instruments has enabled this organization to undertake problems of considerable variety and extent.

Most of the present group were recruited from the staff of the Pacific Salmon Investigations, where the use of electronic instrumentation was most intensive within the Service. Several Bureau employees were instrumental in making the services of this unit available on a non-profit basis not only to the research biologists of the Bureau, but to fishery workers throughout the country.

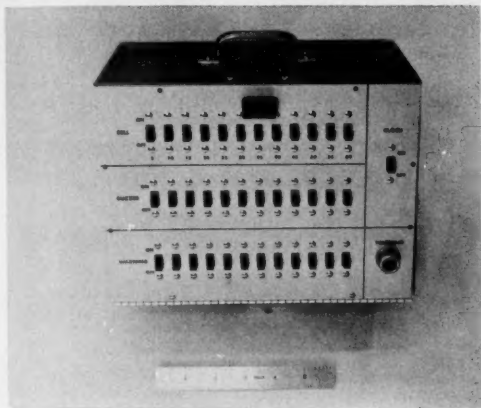


Fig. 4 - Battery-powered intervalometer provides bell buzzer and light indication for precise timing of fish-counting sample intervals.

As a result the Fisheries Instrumentation Laboratory attempts to provide better and less complicated instruments at a lower cost, and to provide information on availability of commercial devices and materials for more efficient use of research funds.

Work requests are necessary for only about one-tenth of the problems, since the Laboratory is usually able to suggest available commercial equipment or services, simplify the problem in other ways, or accomplish the task in a very short time. The extensive files of commercially-available instruments, and the expanding stock of instruments for loan may solve a difficult problem.

Several examples of modern instrumentation applied to fishery research are:

The manner in which an electronic fishing device is used to obtain population data in streams and rivers where nets and other means of collection are difficult if not impossible to use is illustrated in figure 1. Pulsating direct current applied between the hand-held positive electrode and the metal hull of the skiff tend to attract and momentarily stun the fish in the vicinity of the positive electrode. The fish are not harmed by this experience, and are easily captured by dip nets.

An automatic high-speed tagged herring ejector is shown in figure 2. This fantastic machine will recover individual internally-tagged herring from a rapidly moving conveyor belt of the type used in a typical Alaskan herring processing plant. The new device does not slow or otherwise interfere with the high-speed processing of the commercial product.

It must be emphasized that the present state of development of the instrumentation industry is such that a foolproof machine can be made, but it will cost many times what it would be worth to the biologist. The biologist usually wants a satisfactory instrument at an absolute minimum of cost. Conventional design usually is too expensive, and even after considerable ingenuity is exercised a compromise between cost and performance is usually required.

As a result the Fisheries Instrumentation Laboratory attempts to provide better and less complicated in-

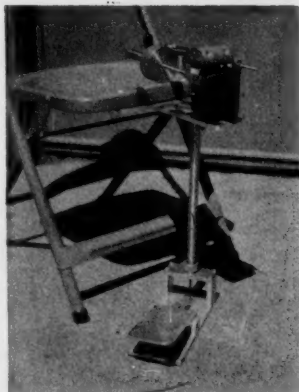


Fig. 5 - Treadle-operated tag injector inserts special metal tag in body cavity of Alaskan herring.

An improved self-contained current recorder being lowered into the water to measure the speed and direction of water flow is shown in figure 3. By means of photographic film exposed at precisely regular intervals, a permanent and accurate record of water speed and compass heading is recorded for a period of 90 days without attention.

A battery-powered intervalometer for selecting any combination of five-minute periods per hour, with bell or buzzer signals (fig. 4). A warning buzzer-and-light sequence is available 30 seconds before the timing bell or buzzer.

A mechanical treadle-operated tag injector which was designed to rapidly insert a small plastic-coated metal tag into the body cavity of herring (fig. 5).

A mechanical half-meter measuring device which reads directly in millimeters the various lengths required by fishery biologists is shown in figure 6. The versa-

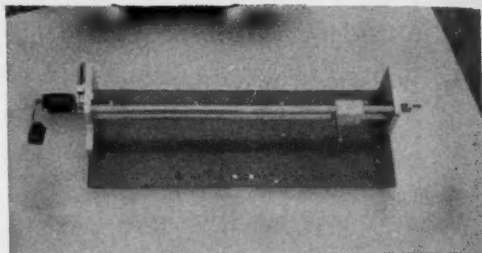


Fig. 6 - Fish-measuring instrument reads directly in millimeters lengths to  $\frac{1}{2}$  meter.

tility of the instrument is greater than its apparent simplicity would seem to indicate. An adapter is available which records this and auxiliary identifying data on either punch cards or teletype tape.

A combination optical and electronic device for the purpose of accurate, rapid, and semi-automatic salmon-scale reading (fig. 7). Although still in the development stage, the new instrument shows tremendous promise.



Fig. 7 - Electro-optic scale reader accurately, rapidly, and semi-automatically provides data on individual salmon scales.

the scale circuli, which are presented as pips on a strip-chart recorder. The new technique greatly simplifies the counting and measurement of circuli and annuli. Future plans call for presentation of the data on punch cards, which will materially increase the speed of the present operation.

A strong light is projected through one of a number of scale impressions on a transparent acetate sheet. A prism and mirror system allows the scale image to be magnified and presented on a smooth white tabletop. The entire scale image is in focus at one time at a magnification of 50 diameters. A narrow slit cut in the surface of the table permits light to fall on a sensitive photomultiplier tube mounted on a movable carriage underneath the table. As the photomultiplier scans the thin line along a scale radius, it detects and amplifies the variations in light intensity representing



A Gulf II plankton sampler which was built in modified form by the Laboratory is shown in figure 8. The sampler is towed at 10 knots, collecting plankton and recording the sampled volume.

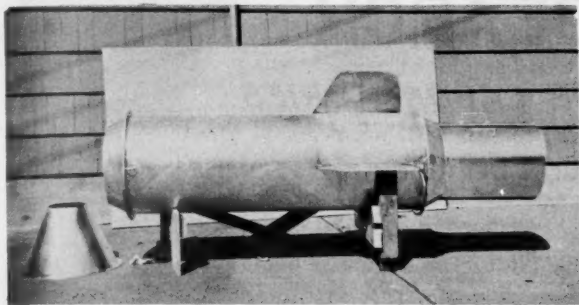


Fig. 8 - Gulf II plankton sampler, modified to comply with needs of Alaska Region, Bureau of Commercial Fisheries.

A portable crab measuring instrument which reads directly in hundredths of inches, from  $\frac{1}{2}$  to 8 inches, is shown in figure 9.

Among fishery agencies which have used the services of the Fisheries Instrumentation Laboratory are the Bureau of Sport Fisheries and Wildlife, the University of Miami, Cornell University, the Canadian Department of Fisheries, and the International Pacific Salmon Fisheries Commission. In addition to correspondence with the 49 states, the Laboratory has received and answered letters concerning instrumentation problems from at least a dozen foreign countries. The wide utilization of this facility and of the instruments developed by it demonstrates the need for instrumentation know-how in the fisheries field, and the advantages alert fishery workers can realize from the services of the Fisheries Instrumentation Laboratory.



Fig. 9 - Portable crab-measuring instrument, accurate to one-hundredth of an inch.



#### SINGAPORE'S SHRIMP PONDS PROFITABLE

The Singapore Ministry of Commerce and Industry in its 1956 Report says that its brackish-water shrimp ponds (which cover 14 acres) since their construction in 1954 yielded 24,032 pounds of prawns and fish, which was sold for about US\$6,400. The cost (\$4,200) of building the embankments, sluice gates, and huts was fully recovered in less than two years.



### FISH-BONE DETECTION DEVICE SHOWS PROMISE

An automatic detector-rejector device which will "spot" bone-bearing fish fillets and eject them from the conveyor line is now a probability, the Department of the Interior reported on February 20, 1959. The device is being perfected by a Fitchburg, Mass., laboratory under a contract with the Bureau of Commercial Fisheries, United States Fish and Wildlife Service.

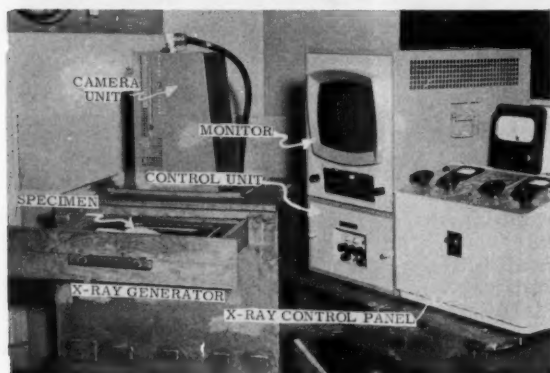


Fig. 1 - TVX system and X-ray generator.

The detector part of the system has already been devised. Future work contemplates a method of adapting the weak electrical signal sent when a bone is detected to activate a mechanical device which will automatically reject fillets containing bones.

The detector system is somewhat similar to that of a closed TV circuit. An X-ray image of the fillet is picked up by a special X-icon tube in place of the standard TV camera. The image is transmitted by wire to a receiving set some distance from the X-ray machine. There it is converted into a visual image by a special monitor. This gives inspectors an opportunity to view the cod and haddock or other fillets and yet be away from the dangers of excessive X-ray exposure.

A truly bone-free fishery product would be much more attractive to the consumer and result in a greater utilization of fish, processors believe. At present a small percentage of bone-containing fillets get past even the most rigid inspection. It is hoped that the Bureau experiments will make it possible for the industry to detect every bone in the early stages of processing.

Previous research had resulted in laboratory use of the fluoroscope to discover fillets containing bones. To protect the worker under this system a reflector was used and the actual inspection of the fluoroscopic image was made in the mirror.



### DISCUSSIONS ON FISHY ODORS AND AUTOXIDATION IN FISH OILS

The Bureau of Commercial Fisheries held a one-day conference at the Food Technology Department, University of California, Davis, Calif., on March 26. Topics for discussion centered about the problems of odor in fishery products, particularly

fish oils, including a consideration of types of odors and the probable mechanism of their formation. A description of some Bureau-sponsored research in this area was given, and samples of fishery products having different types of odors were displayed.

Although the discussions were aimed primarily toward odor and flavor problems with fish oils, many of these problems stem from spoilage and deterioration in the raw fish from which the oil is prepared. Therefore, consideration of the relationship between spoilage and odors were considered in the discussions. This conference generated ideas which should be of interest to many in the fishing industry--from handlers of fresh and frozen fish to producers of fish oils.

The morning session was devoted to fishy odors in fishery products and included a discussion of the definition of types of fishy odors and speculation on chemical reactions and modes of formation; investigations of chemical causes of fishy odors; and investigations on chemistry of fish spoilage. The afternoon session concentrated on autoxidation of fish oils and antioxidants and included discussions on recent results with antioxidant synergists and antagonists for fish oils; studies on mechanism of antioxidant activity; and autoxidation of oils research at Hormel Institute.



## TECHNICAL NOTE NO. 52 - RECOMMENDATIONS FOR PROCESSING FISHERY PRODUCTS FOR LOW-SODIUM DIETS

### BACKGROUND

The drop in use of frozen fishery products by hospitals because of a recent revision of the American Heart Association's dietary recommendations for patients on restricted low-sodium diets may be remedied by slight changes in processing methods and through appropriate labeling of the finished packaged product. Hospitals are large users of fishery products and a curtailment in the use of those products means some financial loss to fish processors. Since fishery products are an inexpensive form of highly nutritious protein, hospital authorities, too, are concerned over the effect of the revised recommendations on their budgets and on the loss of a source of flavor and texture variety in what may be, to the patient, an otherwise monotonous and unappealing diet.

Immediate action on the part of processors is necessary to prevent possible loss of further markets. Some portion of the retail consumer trade may also eliminate fishery products from their diets. Many health-conscious individuals or cardiac patients who are not presently in hospitals carefully follow the Heart Association's diet recommendations. These recommendations are made available to them through the medical profession.

The recommendation of the U. S. Bureau of Commercial Fisheries technologists as to what can be done to solve the problem is to prepare a product suitable for the hospital trade and for persons with low-sodium dietary requirements. The traces of various sodium salts (table salts) normally absorbed by fish fillets during processing enhance the flavor and appearance of the product and are in no wise injurious to the well-being of consumers who have no special dietary requirements. For this reason, the processor may wish to prepare only part of his production to conform to the low-sodium dietary restrictions common to a specific market.

## NATURAL SODIUM CONTENT OF FISH

Research at the Bureau's Technological Laboratories has shown that the natural sodium content of some 34 species of fish is, in general, markedly lower than the medically-prescribed upper limit of 100 milligrams per 100 grams (0.0035 ounces of sodium per 3½-ounce serving portion of meat. The species of fish in table 1 ap-

Table 1 - Natural Sodium Content of Marine and Fresh-Water Fish		
Fish Species	Milligrams of Sodium per 100 Grams <sup>1/</sup>	Milligrams of Sodium Per Oz. <sup>2/</sup>
<b>Marine Fish:</b>		
Albacore tuna . . . . .	34	9.65
Pollock . . . . .	48	13.63
Spanish mackerel . . . . .	48	13.63
Halibut . . . . .	53	15.05
Shad . . . . .	54	15.34
Yellowtail rockfish . . . . .	56	15.90
Sea trout . . . . .	59	16.76
Haddock . . . . .	61	17.32
Ling cod . . . . .	62	17.61
Yellowtail rockfish . . . . .	50	14.20
Scup (porgy) . . . . .	63	17.89
Whiting . . . . .	65	18.46
Whiting . . . . .	82	23.29
Red rockfish . . . . .	66	18.75
Black rockfish . . . . .	66	18.75
Sea bass . . . . .	68	19.31
Red snapper . . . . .	70	19.88
Orange rockfish . . . . .	71	20.17
Pink salmon . . . . .	76	21.59
True cod . . . . .	76	21.59
Pacific ocean perch . . . . .	79	22.44
Ocean perch . . . . .	79	22.44
Mullet . . . . .	81	23.01
Starry flounder . . . . .	85	24.14
Spanish mackerel . . . . .	89	25.28
English sole . . . . .	91	25.85
Petrale sole . . . . .	96	27.27
Average . . . . .	68	19.31
<b>Fresh-Water Fish:</b>		
Lake herring . . . . .	38	10.79
Lake herring . . . . .	56	15.90
Buffalofish . . . . .	50	14.20
Carp . . . . .	51	14.48
Yellow pike . . . . .	52	14.77
Mullet (suckers) . . . . .	52	14.77
Whitefish . . . . .	53	15.05
Sheepshead . . . . .	59	16.76
Sheepshead . . . . .	84	23.86
Yellow perch . . . . .	67	19.03
Average . . . . .	56	15.90
<sup>1/</sup> Corresponds to raw 3½-ounce portion which will yield approximately 3 ounces (84 grams) when cooked. Values should never exceed 100 milligrams per 100 grams when raw.		
<sup>2/</sup> Corresponds to sodium content per diet unit--used as basis for diet development. One unit of fish meat (1 ounce) should not contain appreciably more than 25 milligrams of sodium when raw. (To correct sodium chloride (table salt) values to sodium volume, multiply weight of salt by 0.45.)		

pear to be satisfactory for use in restricted low-sodium diets when used in accordance with instructions, provided no form of sodium such as table salt (sodium chloride) is added during processing.

## EXCESSIVE SODIUM ADDED DURING PROCESSING

Since both marine and fresh-water species of fish contain natural sodium well below the prescribed upper limits, the prohibition against their consumption is based on the sodium added during processing. This usually takes the form of added table salt (sodium chloride) absorbed by the meat during the brining process or added in the canning process. It may, however, be the result of in-process use of sodium hydroxide (lye) as in the preparation of lutefisk, of sodium benzoate, sodium propionate or sodium bisulfite as preservatives or enzyme inhibitors, of sodium alginate or monosodium glutamate as glaze materials, gelling agents, or flavor enhancers. It may even be the result of use of drinking water containing sodium in any form in quantities greater than 5 milligrams per 8 ounces (1 cup) of water. "Softened" water usually contains too much sodium to be used in the preparation of dietetic foods.

## GUIDELINES FOR REDUCING SODIUM CONTENT IN PROCESSED FISHERY PRODUCTS

The following Bureau-recommended processor guidelines for reducing the sodium content

in processed fishery products have been developed from the point of view of the frozen groundfish fillet industry, but they can be also easily adapted to the canned fish industry.

1. Survey carefully the entire processing line to determine that no unrecognized sources of sodium exist which have not been taken into account. Such possible sources may include (1) washing and rinsing waters, (2) brines, (3) preservatives, (4) flavor additives, (5) breeding materials, (6) gelling agents, and (7) glazing materials.

2. Obtain information on the sodium content of wash and rinse waters. If the sodium content is in excess of 5 milligrams per 8 ounces, use another water source. Consult with the local Public Health groups as to the sodium content of the local drinking water supply.

3. Eliminate the use of sodium chloride brines for dipping and washing fillets. If plain water is not suitable because of excessive "drip" from the fillets during thawing, with the aid of an experienced consultant experiment with the use of brines containing salts other than sodium salts. Such salts might conceivably include potassium chloride, potassium citrate, or any of the potassium phosphates. Use of such salts should, of course, be cleared with local food and drug officials.

4. If flavor is considered lacking in the finished product, add lemon juice or approved liquid spices to the plain water in the dipping tank.

5. Do not use sodium-containing preservatives, flavor enhancers, or enzyme inhibitors. Look at the label; the appearance of the words, sodium or soda or of the chemical symbol for sodium, Na, should be warning signs. Watch for these compounds and keep away from them.

6. Obtain periodic reports on the sodium content of the finished product to ensure continued compliance with the prescribed sodium limitations of 100 milligrams per 100 grams of product.

7. Conspicuously label pack as complying with the requirements for a low-sodium diet. The label-face could contain the following types of phrases: "Low-Sodium," "Low-Sodium Dietetic," or "Suitable for Low-Sodium Diets." The term "dietetic," since it may refer to several types of specialized dietary products, is not wholly satisfactory when used alone on the label. The ingredient legend then should (1) plainly state "contains no added salt," (2) should show the sodium content per ounce in milligrams, and (3) should show the sodium content per 100 grams. "Low-Sodium" label declarations are subject to the Food, Drug, and Cosmetic Act. Mislabeled products may be seized by the U. S. Food and Drug Administration.

8. Plan a coordinated promotion campaign to alert the institutional trade and the individual consumer that restricted-sodium dietetic packs of fishery products are available.

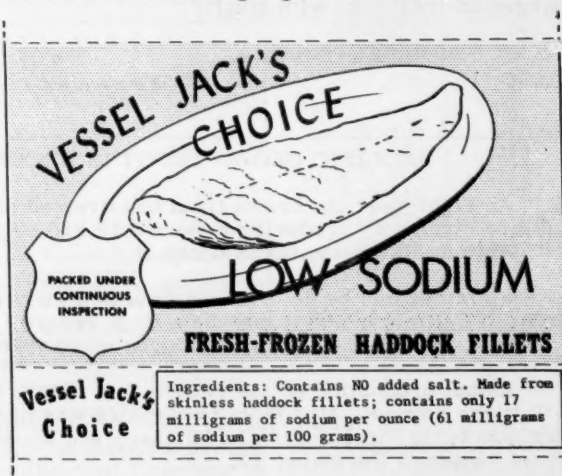


Fig. 1 - One suggested label declaration pointing out that the product complies with the requirements for a low sodium diet.



## CONCLUSION

Most people can eat fishery products as now prepared and, in fact, prefer the added salt flavor. The use of the Bureau's guidelines for reducing the sodium content of processed fishery products by an individual processor should be determined by his knowledge of the requirements of his specific market outlets. The American Heart Association has given assurance of full cooperation in making known that fishery products suitable for low-sodium diets are available.



## CORRECTIONS

In the article "Significance of Ultraviolet Absorption Data of Fish-Oil Fatty Acids," Commercial Fisheries Review, November 1958 - Supplement (vol. 20, no. 11a), formula (c) at the top of page 13 should read:

$$k = \frac{A}{c \cdot l}$$

In the article "Chemical and Nutritional Studies on Fish Oil," Commercial Fisheries Review, November 1958 - Supplement (vol. 20, no. 11a), the third or last sentence of the paragraph headed "UNKNOWN 2, 4-DINITROPHENYLHYDRAZONE DERIVATIVES:" should read: "Most of the nonmigrating compounds gave blue to violet colors when treated with strong alkali, suggesting that they are derivatives of  $\Delta$ -dicarbonyl compounds, but some of the nonmigrating fractions remain unchanged on treatment with alkali."

△△△△△△△△

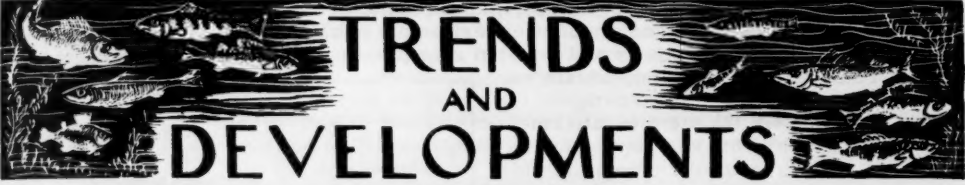
## PROLIFIC BROWN TROUT IN RECORD PERFORMANCE

An eight-year old brown trout has created considerable excitement in fish-culture circles by producing a record 12,040 eggs early in November 1958 at the Mt. Whitney Hatchery, Inyo County.

As far as can be determined, this is a record for artificially-spawned brown trout in California and it may be a U. S. record. Normally, the average two- to three-year old female brown produces about 3,000 eggs.

Actual production by the record fish was 70 liquid ounces of eggs, averaging 172 to the ounce. Milt from two males was needed to fertilize the eggs, which are now being incubated at the hatchery and appear to be of excellent quality. The event happened November 13.

The fish was 29 inches long and weighed  $11\frac{1}{2}$  pounds when hatchery workers took her eggs. A captive fish, the Mt. Whitney brown had been held in the hatchery's display pond as a typical fish of her species. Returned to the pond after spawning, the fish will now rate star billing.



# TRENDS AND DEVELOPMENTS

## Byproducts

UNITED STATES PRODUCTION, 1958: In 1958, the United States production of fish meal and scrap was 216,510 short tons--10.4 percent or 25,246 tons under the production for 1957. The yield of oil from whole fish and waste in 1958 totaled

United States Production of Fish Meal, Oil, and Solubles, 1958			
Product	Unit	January-December	
		1958 <sup>1/</sup>	1957 <sup>2/</sup>
		..... (Quantity). ....	
<b>Meal and Scrap:</b>			
Herring:			
Alaska .....	Tons	6,484	8,799
Maine .....	"	1,898	4,958
Menhaden .....	"	154,145	172,388
Sardine, Pacific .....	"	9,467	1,474
Tuna and mackerel <sup>3/</sup> .....	"	21,494	25,716
Unclassified .....	"	23,022	28,421
Total .....	"	216,510	241,756
<b>Oil, body:</b>			
Groundfish (inc. ocean perch) .....	Gallons	507,108	533,120
Herring:			
Alaska .....	"	1,499,300	1,729,232
Maine .....	"	127,400	147,701
Menhaden .....	"	17,237,329	15,797,919
Sardine, Pacific .....	"	808,324	87,495
Tuna and mackerel <sup>3/</sup> .....	"	659,568	738,279
Other (including whale) .....	"	786,391	1,141,140
Total .....	"	21,625,420	20,174,886
Fish solubles .....	Pounds	197,098,534	187,760,362
Homogenized-condensed fish .....	"	50,558,000	56,786,000
<sup>1/</sup> Preliminary. <sup>2/</sup> Revised. <sup>3/</sup> From market waste. Note: Data on the yield of meal and scrap represent information from firms which usually account for about 92 percent of the total production.			

21.6 million gallons, about 7.2 percent above the production for the preceding year. Production in 1958 of fish solubles increased 5 percent, but production of homogenized-condensed fish declined by about 10.1 percent in 1958 as compared with 1957.



## California

INVESTIGATION OF ABALONE RESOURCES CONTINUED (M/V Nautilus and Diving Boat Mollusk, Cruise 58-N-2): Investigations of the abalone populations in waters off the coast of southern California and the Channel Islands were continued from July 7-November 13, 1958, by the California Fish and Game Department's re-

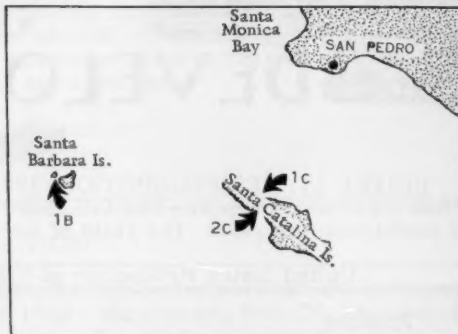
search vessel Nautilus and the diving boat Mollusk. The objectives of the cruise were as follows: (1) determine whether pink abalone are being overexploited or underexploited; (2) design and conduct experiments in habitat improvement; (3) conduct transplanting experiments and develop improved techniques; 4) determine effects of removal of senile individuals on remaining populations; (5) investigate the effects of pollution; (6) tag pink abalone for growth, movement, and reproductive studies; and (7) assess the effects of skin diving on abalone populations in southern California.

Exploratory work was accomplished by divers utilizing SCUBA gear almost exclusively. Some diving required the use of "hard hat" or commercial diving dress.

The majority of time and effort was expended at Santa Catalina Island where considerable diving was necessary in order to locate adequate stations. Three sites were selected and over 600 abalone were tagged and distributed among these stations. New tags were designed and fabricated by the biologists and these were used to tag the 600 abalone. This was necessary because the tags used last year had proved unsatisfactory; the majority disintegrated or disappeared. Most of the 600 abalone that were tagged were shorter than the legal six-inch size limit. This was done purposely to discourage the collection of these animals by skin divers and others. Improved handling techniques have increased survival rate of tagged and transplanted individuals.

A station was located at Santa Barbara Island but weather conditions prevented extensive activities. Observations showed, however, that abalone in this area had been well worked over by commercial divers and few abalone of legal size were left.

Conditions along the mainland coast were unsatisfactory for underwater observations during the portion of time scheduled for this activity. It was not practical to select definite stations at this time. However, preliminary dives were made and several tentative sites were selected. These are in areas available to skin divers and will be of value in appraising the effects of their activities on the abalone population.



Stations occupied during investigations of abalone resources (M/V Nautilus and diving boat Mollusk, July 7-November 13, 1958).

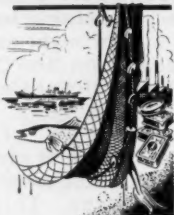


## California Sardines

**LANDINGS IN 1958 SEASON BEST IN SEVEN YEARS:** California sardine fishermen landed 101,567 short tons of sardines for canning in 1958--their best season since 1951. The season in 1958 opened on August 1 and closed December 31. The 1958 landings were five times greater than 1957's total of 20,455 tons, but were only about one-eighth the record of 791,330 tons established in the 1935/36 season. In 1951/52, fishermen landed 126,511 tons.

The 1958 landings yielded a pack of 2,256,800 cases of sardines as compared with about 0.5 million cases in 1957. The byproducts of this pack were 9,467 tons of meal for animal feeding and 808,296 gallons of sardine oil. Of the total catch, only 3,743 tons were used for pet food and other uses.

The California Department of Fish and Game said the catch would have been greater had the major canneries remained open the full season. The big canneries closed about a month before the season ended due to the poor marketing prospects for the canned pack.



Sardines returned to California waters in 1958 from Monterey Bay to San Diego in large numbers. If each vessel had not been on a 40-ton nightly limit and the canners had accepted fish for the entire season, the landings could undoubtedly have been increased by at least 50 percent.

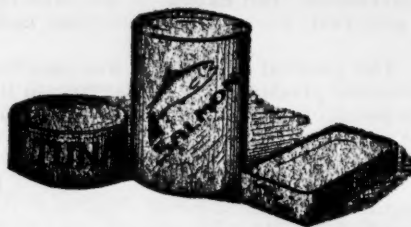
Early in December industry members in Monterey reported the Bay as full of sardines, but only one canner was buying limited quantities at the time.



### Canned Fish Consumer Purchases, January 1959

Canned tuna purchases by household consumers in January 1959 were 849,000 cases of which 50,000 cases were imported. By type of pack, domestic-packed tuna purchases were 191,000 cases solid, 505,000 cases chunk, and 103,000 cases grated or flakes. The average purchase was 1.8 cans at a time. About 28.3 percent of the households bought all types of canned tuna; only 1.8 percent bought the imported product. The average retail price paid for a 7-oz. can of domestic solid or fancy was 35.7¢ and for a 6-1/2-oz. can of chunk 28.9¢. Imported solid or fancy was bought at 30.3¢ a can. January purchases were substantially higher than the 714,000 cases bought in December by 18.3 percent; retail prices were slightly lower.

During January, household consumer purchases of sardines continued to be made more through independent outlets than through chain outlets. Canned sardine purchases in January were 126,000 cases, of which 62,000 cases were Maine, 27,000 cases California, and 37,000 cases imported. The average purchase was 2.1 cans at a time for all sardines, but 2.5 cans for Maine, 1.6 cans for California, and 1.7 cans for imported. Only 7.1 percent of the households bought all types of canned sardines; 3.8 percent bought Maine, 1.4 percent California, and 2.3 percent imported. The average retail price paid for a 4-oz. can of Maine sardines in oil was 11.1¢, for a one-pound can of California 25.0¢, and for a 4-oz. can of imported 27.8¢. January purchases were down by 3.8 percent from the 131,000 cases bought in December; retail prices were slightly lower for

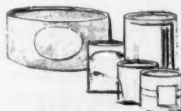


domestic and higher for imported. Because of the liberal stocks of canned California sardines, there has been an increase in purchases since October 1958.

Canned salmon purchases in January 1959 were 261,000 standard cases, of which 134,000 cases were pinks and 56,000 cases reds. The average purchase was 1.2 cans at a time. About 17.2 percent of the households bought all types of canned salmon; 8.7 percent bought pinks. The average retail price paid for a 1-lb. can of pink was 56.8¢, and for red 84.6¢. January purchases were up about 25.5 percent from the 208,000 cases bought in December; retail prices were about the same.



### Cans--Shipments for Fishery Products, 1958



Total shipments of metal cans during 1958 amounted to 123,600 short tons of steel (based on the amount of steel consumed in the manufacture of cans) as compared with 114,560 tons in 1957. In 1956 shipments amounted to 112,532 tons.

The record pack of tuna and substantial increases in the pack of sardines in California, and salmon in Washington and Alaska in 1958 accounted for most of the increase in shipment of cans for fishery products in 1958.

Note: Statistics cover all commercial and captive plants known to be producing metal cans. Reported in base boxes of steel consumed in the manufacture of cans, the data for fishery products are converted to tons of steel by using the factor: 23.0 base boxes of steel equal one short ton of steel.



### Containers

**USE OF ALUMINUM CANS FOR CANNED FISHERY PRODUCTS:** After a number of years of commercial use in Europe, aluminum sardine cans are being tried out on a commercial scale by one United States fish canner. This was brought out in an address ("The Status of Aluminum For Food Cans") to the session on New Containers and Container Problems at the 52nd Annual Convention of the National Canners Association, Chicago, Ill., February 21, 1959.

In pointing out the advantages and disadvantages, the speakers stated that aluminum containers in which sulfur-bearing vegetables or products containing meats have been packed do not show any discoloration under enamel after storage. This is an aesthetic advantage over tin-plate containers. Also eliminated is the occasional but somewhat more serious problem with certain products where black iron sulfide can form in localized areas of the tin-plate containers and in some instances appears on the product itself. This problem has been encountered most usually in seafood packs, such as tuna and shrimp. For tuna, the use of aluminum containers would appear to be a happy solution, but with shrimp the benefits are exchanged for two considerably worse effects. The pinkish cast and color bands are bleached completely to turn the shrimp muddy gray and a very strong hydrogen sulfide-like odor is developed. But except in the case of shrimp, flavor and odor differences were not generally found when aluminum cans were used.

The general conclusion was that the use of aluminum cans for large volume processed products seems farther in the future. To supply and use containers for such products would require major equipment changes by can manufacturers and food packers.



### Federal Purchases of Fishery Products

**DEPARTMENT OF DEFENSE PURCHASES, JANUARY 1959: Fresh and Frozen Fishery Products:** For the use of the Armed Forces under the Department of Defense, 1.5 million pounds (value

Table 1 - Fresh and Frozen Fishery Products Purchased by Military Subsistence Market Centers, January 1959 with Comparisons

QUANTITY			VALUE	
January	Jan.-Dec.	January	January	January
1959	1958	1958	1959	1958
... (1,000 Lbs.) ...			... (\$1,000) ...	
1,489	1,692	22,511	844	943

this January was lower by 4.4 percent as compared with the preceding month and down by 10.5 percent from January 1958.

Prices paid for fresh and frozen fishery products by the Department of Defense in January 1959 averaged 56.7 cents a pound, about 2.5 cents higher than the 54.2 cents paid in December and 1.5 cent higher than the 55.7 cents paid during January a year ago.

Table 2 - Canned Fishery Products Purchased by Military Subsistence Market Centers, January 1959 with Comparisons

Product	QUANTITY			VALUE	
	January		Jan.-Dec.	January	
	1959	1958	1958	1959	1958
... (1,000 Lbs.) ...			... (\$1,000) ...		
Tuna . . .	385	316	5,884	192	164
Salmon . .	-	695	3,336	-	378
Sardine . .	12	18	253	4	6



**Canned Fishery Products:** Tuna was the principal canned fishery product purchased for the use of the Armed Forces during January 1959.

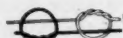
**Note:** Armed Forces installations generally make some local purchases not included in the data given; actual total purchases are higher than indicated, because it is not possible to obtain local purchases.

\* \* \* \* \*

**VETERANS ADMINISTRATION REQUIREMENTS FOR CANNED FISH FROM 1959 PACK:** Estimated requirements of the Veterans Administration for canned fish to be procured from the 1959 pack are:

	Can Size	Dozen Cans
Salmon, red or sockeye . . . . .	#1	21,954
Salmon, red or sockeye, sodium content restricted to not more than 60 mg./100 grams . . . . .	# $\frac{1}{2}$	7,421
Tuna, light meat, chunk style in vegetable oil . . . . .	4-lb.	5,400
Tuna, light meat, chunk style, sodium content restricted to not more than 50 mg./100 grams . . . . .	# $\frac{1}{2}$	8,750

**Note:** See Commercial Fisheries Review, May 1958, p. 29.



### Fisheries Loan Fund

**LOANS APPROVED THROUGH FEBRUARY 28, 1959:** A total of 287 loans for \$7,321,692 has been approved through February 28, 1959, a period of almost 26 months. By areas these were divided as follows:

New England, 103--\$3,069,485; South Atlantic & Gulf, 44--\$1,390,873; California, 41--\$1,911,882; Pacific Northwest, 56--\$659,101; Alaska, 29--\$184,075; Great Lakes, 7--\$51,220; Hawaii, 6--\$53,256; and Puerto Rico, 1--\$1,800.

Under the Fishery Loan Program, loans are made for financing and refinancing operations, maintenance, repairs, replacement, equipment of fishing vessels, fishing gear, and for research into the basic problem of the fisheries. Loans at 5 percent interest are made for periods not to exceed 10 years.

**Note:** See Commercial Fisheries Review, February 1959, p. 17; December 1958, p. 35; November 1958, p. 35; September 1958, p. 35; July 1958, p. 24; and March 1958, p. 31.



### Fish Farming

**FAO LOANS EXPERT TO FISH AND WILDLIFE SERVICE:** Upon request of the Department of the Interior's Fish and Wildlife Service, the Food and Agriculture Organization of the United Nations has assigned Dr. Shaowen Ling, one of the world's leading pond-fish culturists, to the Bureau of Sport Fisheries and Wildlife for a three-months period.

Dr. Ling, who has his doctor's degree in limnology from Cornell University, is a native of China. He will act as consultant for the Bureau of Sport Fisheries and Wildlife on the establishment of a research laboratory and experimental station which is to be built in Arkansas to study fish propagation problems in rice-growing areas.

His main task will be to visit possible experimental sites, recommend pond layouts and develop plans for research in the fields of warm-water fish diseases and

parasites, genetics, selective breeding, nutrition, and other physiological requirements, and to make recommendations on fish-crop rotations.

Before beginning his assignment in the rice-growing area, Dr. Ling will survey research stations and warm-water fish hatcheries in the South and will consult with one of America's leading fish culturists, Dr. H. S. Swingle of Alabama Polytechnic Institute at Auburn.

In spite of the widespread practice of fish culture in foreign countries, the idea never took hold in the United States until in recent years when the rice farmers of Arkansas became interested in fish farming almost by accident. In bringing new rice acreage into production it was customary to build levees around a tract of land, filling the resulting reservoir with water and letting it stand for a couple of years until the timber died and the decaying vegetation enriched the soil.



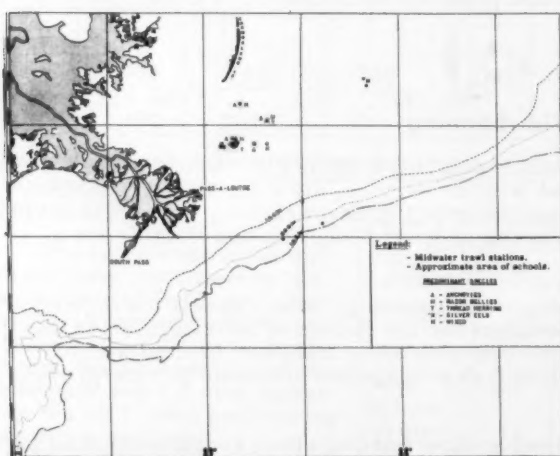
Following the procedure, farmers soon found that the water in the reservoirs always contained abundant supplies of the local species of fish. Presently the question arose as to whether better breeds of fish might be raised to bring a greater yield and a more lucrative cash crop to the farmer.

To find the answer to this question, the Congress has authorized the Fish and Wildlife Service of the Department of the Interior to establish a laboratory and experiment station.

Dr. Ling has just completed an assignment in Ceylon assisting the government of that country in the development of its inland fisheries. When he completes his task in America he will go to Malaya to help that newly created independent nation with its fishery problems.



### Gulf Exploratory Fishery Program



M/V Oregon Cruise 56 (January 20-February 4, 1959).

**EXPERIMENTAL MID-WATER TRAWL FISHING OFF THE MISSISSIPPI DELTA (M/V Oregon Cruise 56):** Sampling mid-water fish schools for species composition data was the principal objective of a 16-day trip by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Oregon ending on February 4, 1959. The 40-foot square nylon mid-water trawls were used in conjunction with a newly installed telemeter. The instrument, recently developed by the Bureau, transmits depth and temperature data from the gear to the vessel via electric trawl cables, permitting very effective depth-positioning of the trawl.

Day-and-night transects were run over the 5- to 100-fathom depth

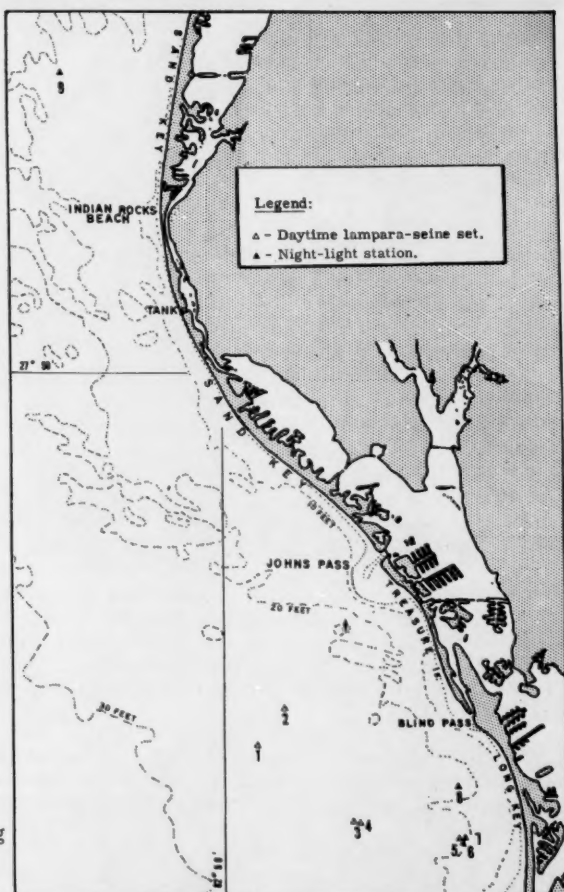
range between the Mississippi Delta and Mobile Bay. With rare exceptions mid-water schools were seen on the recorders during daylight hours only. Schools beyond the 15-fathom curve were few and small. Scattered, unidentified schools observed on one occasion in 30 to 50 fathoms off the Delta could not be fished due to heavy seas.

Schools were most numerous in the 8- to 12-fathom zone between Pass-a-Loutre and Chandeleur Island. Half-hour tows through scattered schools yielded catches of 500 to 1,000 pounds of mixed thread herring, razorbellies, and anchovies. One afternoon of fishing this area resulted in a catch of about 6,000 pounds of mixed fish. Correlations of recorder tracing and trawl catches indicated mixed schooling by the above species.

\* \* \* \* \*

**LAMPARA SEINES AND HAULING EQUIPMENT TESTED OFF FLORIDA WEST COAST (M/V George M. Bowers Cruise 16):** A 15-day cruise along the west coast of Florida for the purpose of testing experimental lampara seines and hauling equipment on school fishes was completed by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel George M. Bowers on February 4, 1959. A 285-fathom-modified South African lampara seine, a 150-fathom cotton bait lampara seine, and a 75 fathom-nylon seine were used. The hauling gear was a 30 hp. hydraulic-powered two-roller gurdy.

The first phase was in the Apalachicola and Carrabell Bay areas, where bad weather prevented locating school fish with aerial spotting. The vessel proceeded to the St. Petersburg Beach area, and aerial spotting was used in making sets. Results of these sets were unsatisfactory chiefly because the size and weight of the vessel created a heavy pull on the wings of the seines, lifting the chain line and creating a large opening at the head of the seine, through which most of the fish escaped. Sets made from the seine skiff using the 75-fathom seine, with hauling done by hand, indicated the use of a lighter vessel should give better results. One- to two-ton catches of thread herring were made under these conditions. Heavy concentrations of schools were observed in the St. Petersburg Beach area,



M/V George M. Bowers Cruise 16 (January 20 to February 4, 1959).



equate to maintain civilian consumption of these items at a slightly higher rate this winter and early spring than last. Retail prices of fishery products in 1958 were the highest on record. Prospects for the next few months are that prices will continue at a high level.

The catch of edible fish and shellfish was somewhat larger in 1958 than in 1957. There was a moderate increase for the species used for canning, and a slight advance in landings of items marketed mainly fresh and frozen. Commercial landings in the first quarter are at the seasonal low point of the year.

The pack of canned fishery products last year was well above that of 1957. Among the major items, Maine sardines and mackerel were the only ones for which a reduction occurred. The pack of canned salmon was up sharply in 1958. Production of California sardines (pilchards) was more than  $4\frac{1}{2}$  times as large as in 1957 and the heaviest since 1951. The canned tuna pack reached a record level. The domestic catch of tuna in 1958 was up only a little from the 1957 total, but imports of frozen tuna for processing were considerably heavier. Supplies of canned fishery products available for consumption in the next several months are well above the year-earlier total.

Total stocks of frozen fishery products at the beginning of this year were much larger than on the same date in 1958. Stocks represent the principal source of supplies of these items until at least mid-spring when the commercial catch of fish and shellfish starts increasing seasonally.

Imports of fishery products were moderately heavier last year than in 1957. The increase was relatively larger for the canned than for the fresh or frozen products. Receipts of canned salmon and the sardines not in oil were heaviest in the first half of 1958 when domestic supplies were relatively light. Imports in the next several months will likely be less than a year earlier because domestic supplies are larger. Exports were much lower in 1958 than in 1957 because of our reduced supplies of canned fish earlier in the year. Prospects are for exports to be heavier this winter and spring than last.

This analysis appeared in a report prepared by the Agricultural Marketing Service, U. S. Department of Agriculture, in cooperation with the Bureau of Commercial Fisheries, U. S. Department of the Interior, and published in the former agency's February 25, 1959, release of The National Food Situation (NFS-87).



### Menhaden

UNITED STATES LANDINGS, 1956-1958: Landings of menhaden in the United States during 1958 amounted to 1,527.2 million pounds as compared with 1,683.1 million pounds in 1957, and 2,097.2 million pounds in 1956.

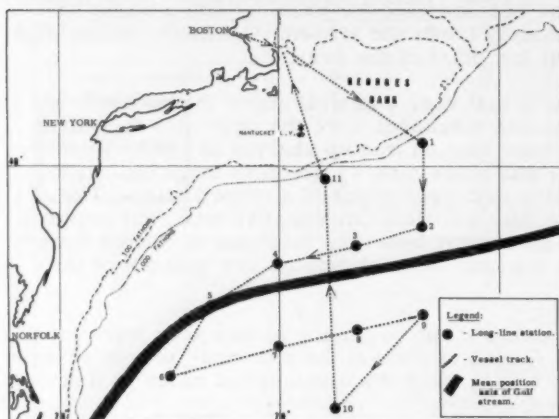
U. S. Menhaden Catch, 1956-1958			
States	1958	1957	1956
	. (Millions of Pounds) .		
Maine, Mass., and Rhode Island . . . . .	12.2	41.3	78.8
New York, New Jersey, Delaware, and Virginia . . . . .	837.8	1,068.6	1,144.0
North Carolina, South Carolina, & Florida East Coast . . . . .	244.2	208.0	314.6
Florida West Coast, Louisiana, Mississippi, and Texas . . . . .	433.0	365.2	559.8
Total . . . . .	1,527.2	1,683.1	2,097.2





### North Atlantic Fisheries Exploration and Gear Research

**COMMERCIAL STOCKS OF TUNA FOUND IN WESTERN NORTH ATLANTIC**  
(M/V Delaware Cruise 59-1): Commercial concentrations of bluefin tuna (*Thunnus thynnus*) with other tuna species were found in the Gulf Stream area of the western North Atlantic during this cruise (January 12-February 6, 1959) of the U. S. Bureau



Tuna exploration by M/V Delaware Cruise 59-1 (January 12-February 6, 1959).

of Commercial Fisheries exploratory fishing vessel Delaware. This marks the first time tuna have been caught in such quantity in the winter months. The results of this cruise contribute substantially to the knowledge of the distribution of tuna species in the North Atlantic, especially at this time of the year.

The Delaware's most significant catch was made in the Gulf Stream area 280 miles south of Nantucket Island and 287 miles east of Cape Henry at 36°46' north latitude and 70°00' west longitude. Here, over 5 tons of tuna were caught on only 60 baskets of gear. The catch consisted of 34 large bluefin, 9 yellowfin (*Thunnus albacares*) and 4 albacore tuna (*Thunnus alalunga*). The surface water temperature was 74.2° F--the highest temperature recorded at any station. Bluefin tuna occurred in most of the areas fished. The exceptions were Stations 1 and 11, lying well to the north of the Gulf Stream, and Stations 6 and 10, lying to the east and south of the Gulf Stream. Substantial concentrations of bluefin tuna were taken at Stations 2 and 4. On 45 baskets of gear, 15 bluefin and 5 albacore tuna were taken at Station 2; while 25 bluefin, 1 albacore, and 1 big-eyed (*Thunnus obesus*) were caught at Station 4 using the same amount of gear.

Table 1 - Tuna Exploration in Western North Atlantic by M/V Delaware (Cruise 59-1)

Station	Position		Baskets Set	Surface Temp. °F	Species Tuna	Number of Fish	Approx. Wt. Lbs.	Other Species
	W. Long.	N. Lat.						
1	66°42'	40°24'	30	49.8	-	-	-	-
2	66°42'	38°57'	45	52.8	Bluefin	15	2,150	Blue shark (1), lancetfish (3)
3	68°14'	38°35'	45	58.6	Bluefin	6	365	Blue shark (1)
					Albacore	3	110	Ray (1)
					Big-eyed	1	60	-
4	70°00'	38°16'	45	57.2	Bluefin	25	3,500	-
					Albacore	1	30	-
					Big-eyed	1	50	-
5	71°33'	37°30'	45	56.4	Bluefin	2	280	Mackerel shark (1)
					Big-eyed	1	75	Lancetfish (2)
6	72°28'	36°15'	60	Bgn 66.8 End 73.6	Yellowfin	7	230	Blue shark (12), lancetfish (2)
7	70°00'	36°46'	60	74.2	Bluefin	34	10,080	Ray (1), lancetfish (1)
					Albacore	4	110	-
					Yellowfin	9	320	-
8	68°14'	37°03'	60	-	Yellowfin	1	30	Mako shark (1)
					Bluefin	2	600	Dolphin (3)
9	66°42'	37°24'	45	70.8	Bluefin	4	950	Blue shark (3), lancetfish (1)
					Albacore	1	30	Hammerhead shark (1)
					Yellowfin	1	20	-
					Skipjack	1	15	-
10	68°45'	35°39'	50	65.4	Albacore	1	30	Blue shark (3), lancetfish (1)
11	68°55'	39°45'	41	53.1	Albacore	2	60	Lancetfish (1)

Yellowfin tuna were taken at Stations 6-9, inclusive, in surface water temperatures from 66.8° F. to 74.2° F. Big-eyed tuna occurred only at Stations 3, 4, and 5 in surface water temperatures of 58.6° F., 57.2° F., and 56.4° F., respectively.

Oceanographic data was collected at all fishing stations in cooperation with the Woods Hole Oceanographic Institution. Night lighting for small specimens was conducted, in addition to the collection of biological data on the various species of tuna.

Several severe storms were encountered during the cruise. These storms resulted in very rough seas which caused extensive damage to the port life boat.

Note: Also see Commercial Fisheries Review, February 1959, p. 25.



## Oceanography

**WIDER STUDY OF THE SEA URGED:** The Committee on Oceanography of the National Academy of Sciences - National Research Council warned on February 15, 1959, that the United States must--within the next ten years--double its present rate of deep-sea research or face serious economic, political, and military hazards.

"Action on a scale appreciably less than that recommended," the Committee declared, "will jeopardize the position of oceanography in the United States relative to the position of the science in other major nations, thereby accentuating serious military and political dangers, and placing the nation at a disadvantage in the future use of the resources of the sea."

This warning came at the head of a list of detailed recommendations released by the Committee in advance of a more extensive report to be published later. The Committee was appointed in 1957 by the President of the Academy-Research Council, and supported by the U. S. Atomic Energy Commission, U. S. Bureau of Commercial Fisheries, National Science Foundation, and Office of Naval Research.

The cost of the ten-year program, it was estimated, would total \$651,410,000 over and above the present level of support.

The three principal recommendations of the Committee were that:

1. The United States government should expand its support of the marine sciences at a rate which will result in at least a doubling of basic research activity during the next ten years.
2. The increase in support of basic research should be accompanied during the next ten years by a new program of ocean-wide surveys. This will require a two-fold expansion of the present surveying effort.
3. The United States should expand considerably its support of the applied marine sciences, particularly in the areas of military defense, marine resources, and marine radioactivity.

To explain the urgent nature of its recommendations, the report points out the many benefits that

could accrue from intensive oceanographic research--in the acquisition of new knowledge, the development of the oceans' vast mineral and food resources, more accurate prediction and possible control of climatological change, and the improvement of military defenses against surprise attacks by missile-launching submarines. Excerpts from the report follow:

**New Knowledge:** "The seas present a challenge to man which in magnitude approaches that of space. . . . We know less about many regions of the oceans today than we know about the lunar surface. Yet we have learned enough to know the major features of the ocean floor--35,000-foot trenches; 2,000-mile-long fracture zones; flat-topped under-sea mountains; broad ocean-long ridges; abyssal plains as flat as a calm sea--are uniquely different from anything either on the surface of the moon or on the land surfaces of the earth. How and when were these features formed and why are they so different? An answer to these questions is essential if we are to decipher the history of our planet and its sister planets. Part of the answer lies in the records of ancient earth history locked in deep sea sediments; part will come from an intensive study of the rocks under the ocean. These studies, combined with studies of the waters and the living creatures of the sea, will also tell us much about the origin and evolution of life on earth."

"During the last few years, four great subsurface ocean currents--rivers in the depths of the sea one thousand times greater in flow than the Mississippi--have been discovered using newly developed current-measuring techniques. We suspect that others exist and we need to know where the waters come from and where they go."

**Ocean Resources:** "On the practical side the problems to be solved concerning the oceans are at least as urgent as those of space. How many fish are in the sea? No man knows, nor do we know what determines the numbers of fishes in different regions, the quantities of plant and animal material on which they feed, or what could be done to increase these numbers. We must learn these things if we are to help solve the increasingly acute problems of providing animal protein food for the growing numbers of underfed people in the world. Given more study man can economically harvest considerably more food from the seas than

is now possible. Considering the position of the United States in the community of nations, it seems appropriate, even essential, that we lead the way in this respect."

**Climate Studies:** "We know that the average weather conditions we call climate can change over a few decades, and we suspect that changes in the storage of gases and heat in the oceans will profoundly influence the process. Studies of the mechanisms of interchange between the air-sea boundaries of regions where intense interchange occurs and of the slow mixing between the ocean depths and the surface which controls storage of heat and gases are essential for further understanding, hence for prediction and possibility of control."

**What is Needed:** "With these problems and prospects in mind, this Committee has attempted to assess the steps which should be taken in order that the United States might possess outstanding capabilities in the oceanographic field, and in order that we might obtain sufficient knowledge in time to avert a "crash" program--which would be wasteful in terms both of money and valuable technical manpower."

"Of particular importance among the facilities are ships, which are to the oceanographer what cyclotrons or reactors are to the nuclear physicist. He simply cannot undertake adequate research without them."

"Our oceanographic research ships are inadequate for the job which must be done. Most of the ships are old and outdated. Many are obsolete and should be replaced by ships of modern design which will be more efficient to operate and from which a greater variety of scientific observations can be made. In addition, the number should be increased."

"The oceanographer also needs improved instruments if he is to penetrate the water barrier and learn in detail about conditions at great depths. Accordingly, the Committee has recommended the establishment of a program of broad scope, aimed at developing and using new instruments and devices for exploring the sea. Using new deep-diving vehicles, for example, it is now possible for man to observe directly the ocean depths. It seems highly likely that within the next ten years men will descend through the water nearly seven miles to the deepest point on earth."

**Federal Agencies Involved:** "To achieve these aims in the next ten years will necessitate many agencies of the Federal Government working together both in planning and in providing the monies. Taking into account the relative degrees of interest and importance of oceanography to individual agencies, the Committee recommends:

"The Navy and the National Science Foundation should each finance about 50 percent of the new basic research activity except ship construction. The Navy should finance 50 percent of the new research ship construction with the Maritime Administration and the National Science Foundation sharing the remainder. The Navy, through the Hydrographic Office, should finance 50 percent of the deep ocean surveys, while the Coast and Geo-

detic Survey should finance the balance. The Navy should sponsor completely all military research and development operations. The Bureau of Commercial Fisheries should finance the greater part of the recommended ocean resources program. The Atomic Energy Commission should finance the major part of the research dealing with the problems of radioactive contamination of the oceans. The National Science Foundation and the Office of Education should jointly the proposed program for increasing scientific and technical manpower in the marine sciences. Efforts aimed at fostering international cooperation in the marine sciences should be sponsored by the Department of State, the International Cooperation Administration, and the National Science Foundation. Other agencies should take responsibility for certain aspects of the proposed program, particularly the Public Health Service, the Geological Survey, and the Bureau of Mines."

"Although the bulk of oceanographic research and survey work must of necessity be financed by the Federal Government, the value of state and private funds cannot be overestimated. Such funds are especially helpful for supporting initial exploratory basic research and for starting new laboratories. Accordingly, the Committee recommends:

"Private foundations and universities, industry, and state government should all take an active part in the recommended program of expansion."

**Specific Recommendations:** The Committee advocated the broadening of educational opportunities in oceanography for graduate scientists through action by universities, the Federal Government, and the scientific community at large. This might be accomplished, the report stated, by increasing the size of oceanographic faculties, by the affiliation of oceanographic research institutions with university faculties, the development of new oceanographic centers at universities with adequate existing facilities, and the creation of long-term fellowships tenable at more than one university. The Federal Government was asked to aid in the financing of the recommended faculty increases to the amount of \$500,000 a year for salaries and other costs associated with the positions. The scientific community was asked to undertake more active recruiting of prospective oceanographers among undergraduate students of physics, chemistry, biology, and geology.

**Need for New Ships Cited:** The report undertakes to map out a detailed program for the construction of a fleet of research ships, noting that the "conversion of vessels that were originally designed for other purposes into research, development, or survey vessels is to be discouraged."

The Committee's recommendations call for the construction of 70 ships of 500 to 2,200 tons displacement between 1960 and 1970, which would result in the modernization of the present fleet of 45 small vessels and its increase in size to a total of 85 ships of various capacities, at a cost of \$213,000,000. Responsibilities for construction would be assigned to government agencies with appropriate interests, including the Navy, Coast and Geodetic Survey, Bureau of Commercial Fisheries, National Science Foundation, and the Maritime Administration.

The report also recommended that the Maritime Administration be consulted in the designing of all research ships paid for from public funds and that all noncombatant surface ships used for research, development, or surveying be manned by civilian crews.

The report further advised that the addition of each ship to research activity would result in an accompanying need for about 60 shore-based technicians, the construction of about \$1,500,000 in shore facilities, and the expenditure of about \$1,200,000 per year in their operation. It was recommended that these costs be divided between the Navy and the National Science Foundation.

Shore facilities will also be needed for survey ships, the report added. It recommended an initial allocation of \$750,000 for construction costs and an equal annual allocation for operations be made for each new survey ship placed in operation. These costs would be divided between the Navy and the Coast and Geodetic Survey.

**Engineering Needs:** The Committee declared that the advancement of our knowledge of the oceans depended greatly upon the development of radically new devices, the improvement of currently available vehicles, and the working out of new research techniques. The report called for the development of manned submersibles that can operate down to and on the bottom of most of the oceans; stable, mid-ocean research platforms; anchored and drifting deep-sea buoys; and ice-breaking submarines. Need was also anticipated for assigned aircraft, up to four-engined; new engineering techniques for deep-sea drilling and bottom-sampling; and more effective instrumentation. A ten-year budget of \$100,400,000 was proposed.

**Radioactivity in the Oceans:** The report recommended that one agency be given over-all responsibility and authority for regulating the introduction of radioactive materials into the oceans and another the responsibility for monitoring. Vigorous programs should be launched, the report continued, to study circulating and mixing processes in the oceans, inorganic transfer of radioactive elements

to sedimentary deposits, and effect of radioactive elements on marine organisms. It was estimated that ten-year costs of new research in this area would cost approximately \$44,130,000.

**Ocean Resources:** Many activities to add to our understanding of marine biological resources were recommended, including laboratory studies of fish mortality, behavior, and genetics; feasibility studies on salt-water pond fish culture, addition of nutrients to increase the productivity of marine organisms, and on marine transplantation; and surveys of ocean life.

Concerning mineral resources, the report stated: "Existing knowledge is inadequate to determine the feasibility of creating a marine mineral industry."

A ten-year budget for new research of \$78,540,000 was proposed.

**International Cooperation:** In the field of international cooperation, the Committee recommended that the U. S. offer financial support, through the National Science Foundation, to the Special Committee on Oceanic Research of the International Council of Scientific Unions, and that additional funds be sought to support participation in the Special Committee's proposed year-long study of the Indian Ocean. The report further recommended the promotion of increased intergovernmental cooperation in oceanographic studies and the encouragement of international programs in the use of protein foods from the sea for human nutrition, particularly in undeveloped areas.

#### Proposed Ten-Year (1960-70) Budget for New Oceanographic Activity by Federal Agency

Navy .....	\$278,240,000
Coast and Geodetic Survey .....	78,040,000
Bureau of Commercial Fisheries .....	123,160,000
Maritime Administration .....	10,900,000
National Science Foundation .....	121,040,000
Office of Education .....	5,000,000
Atomic Energy Commission .....	32,430,000
Bureau of Mines .....	2,600,000
<b>Total .....</b>	<b>\$651,410,000</b>



## Oregon

**FISH AND SHELLFISH LANDINGS, 1958:** Landings of fish and shellfish by the commercial fishermen of Oregon totaled 57.8 million pounds--2.1 percent above the 1957 total of 56.6 million pounds. The landings in 1958 were sharply higher for albacore tuna (increased from 3.4 million pounds in 1957 to 9.8 million pounds in 1958). However, salmon landings were lower by 28.2 percent in 1958 as compared with the preceding year. The new shrimp fishery off the coast of Oregon yielded close to 1.6 million pounds, an increase of over 400 percent from 1957.



#### Oregon Landings of Fish and Shellfish, 1958

Species	January-December	
	1958	1957
	.. (1,000 Lbs.) ..	
<b>Salmon:</b>		
Blueback .....	534	189
Chinook .....	6,021	6,784
Chum .....	163	155
Pink .....	-	100
Silver .....	1,439	4,125
<b>Total salmon .....</b>	<b>8,157</b>	<b>11,353</b>
Shad .....	450	339
Smelt .....	216	347
Steelhead .....	480	539
Striped bass .....	22	13
Sturgeon, green .....	43	70
white .....	147	183
Bottom fish <sup>1</sup> .....	26,079	28,074
Tuna, albacore .....	9,754	3,277
Clams <sup>2</sup> .....	160	173
Crabs <sup>3</sup> .....	10,747	11,934
Shrimp .....	1,550	287
<b>Grand Total .....</b>	<b>57,805</b>	<b>56,589</b>

<sup>1</sup>/Includes landings of fish lives.

<sup>2</sup>/Weight to the shell.

<sup>3</sup>/Based on a weight of 25 pounds per dozen.



### Pacific Oceanic Fishery Investigations

SKIPJACK TUNA MIGRATION STUDIES INITIATED (M/V Hugh M. Smith): The fishery research vessel Hugh M. Smith of the U. S. Bureau of Commercial Fisheries Hawaii Area Biological Laboratory at Honolulu returned February 11 from a 5-week cruise in waters around the Hawaiian Islands. This cruise was one in a series planned to learn more about the migration of skipjack tuna which, in varying numbers, enter Hawaiian waters each year and are important to the Hawaiian fishing industry.

The vessel worked in an area extending several hundred miles to the east, the south, and the west of the island chain. Observations included those for sea-surface temperatures and salinity, plankton, deep-swimming fishes, and the numbers of surface schools and of bird flocks. Except for scattering schools of small skipjack, few surface schools were sighted. No schools of the larger season skipjack were observed. These results suggest that the season fish migrate each winter to distant parts of the ocean which are at least 800 miles from the Hawaiian Islands--to areas as yet unknown.

The results of the oceanographic observations made aboard the vessel reveal that surface waters characterized by low salinity and high temperatures had penetrated northward to a line extending from approximately 120 miles east of the Island of Hawaii to 250 miles to the south and west of the Island of Kauai. Only isolated pockets of water of the type believed by the scientists of the Bureau to be preferred by the skipjack were found. The northward movement of the low-salinity high-temperature waters is believed to be a comparatively uncommon occurrence. The effects of this movement upon the migrations of the skipjack are anxiously awaited and will be studied during the forthcoming spring and summer cruises.



### Packaging

EFFECT OF MULTIPLE PACKAGING ON SALES OF CANNED MAINE SARDINES TESTED: A test of multiple-packaging for canned Maine sardines was conducted cooperatively by the Maine Sardine Council, a large container company, a Philadelphia retail food market chain, and a Philadelphia research company about a year ago.

Eight different packaging arrangements for the canned sardines were used. Each was either a loose can arrangement, a multiple-packaging arrangement, or a combination of loose cans and multi-packs. Three-packs (three cans to the package), four-packs, and six-packs alone were tested. The multi-pack with loose cans and in combinations with other multi-packs was tested. Each variation lasted two weeks in each store. No publicity or advertising was used; no price cuts were offered.

The results showed that sales of multi-packs greatly increased the sales of sardines. For example, the three-pack without loose cans on the shelf did the best and showed a sales gain of 34 percent. This was a 34-percent increase over loose cans with no multi-packs, but priced 3 for 29 cents.

It was also learned that the closer the store came to the normal multiple-pricing structure--3 cans for 29 cents is an example--the less need there was for loose cans on the shelf with the multiple-packaged product. For instance, for the three-pack and loose combination, the ratio of three-packs to loose cans sold was 70:30. With the six-pack and loose combination, however, the picture changed--the ratio of six-pack to loose was 58:42.



In addition to sales gains, the test revealed a few other marketing conclusions:

(1) Income level is a factor in sardine multi-pack buying. Whether the shopper buys a three-pack or a six-pack, for instance, depends on the income level.

(2) Three-packs sell best in low-income neighborhoods.

(3) The three-pack, six-pack combination does best in stores serving higher income people.

Evidently low-income shoppers shrink from tying up too much money in one item at one time. (Excerpts from address, "Factors that Affect Response to Multiple Packaging," at the Marketing Session of the 52nd Annual Convention of the National Canners Association, Chicago, Ill., February 22, 1959.)



### Sea Otter Food Habits Under Study

A study to determine trends in the availability of feed and the range for sea otter is being conducted by a diving biologist with SCUBA gear. This innovation was announced on February 24 by the Department of the Interior.

The site of the operation is Kuluk Bay, Adak, Aleutian Islands National Wildlife Refuge. The work is being done by the U. S. Bureau of Sport Fisheries and Wildlife. A typical frogman's suit, with the self-contained underwater breathing apparatus is used. Two lungs are provided, one of them being held in reserve in case extra decompression time becomes necessary.



Adult sea otter hauled out on the rocks.

The project is intended as a sea otter food study in an area of growing sea otter population. Kuluk Bay was chosen because a small colony of sea otters has already established itself there, it is typical sea otter habitat, and a nearby Naval Base facilitates the logistics of the project. Needless to say the water is usually cold and often whipped to violence by high winds. Activity is often hampered by waves and weather.

Because of the newness of the project no definite conclusions have been reached except to verify that in the portions of Kuluk Bay explored there is plenty of sea otter food and lots of other sea life in which the sea otter has no interest. The sea urchin, a shellfish which looks like a cocklebur, is a primary article of diet for the otter. It was found on the bottom in numbers.

The fringed greenling, two varieties of crabs, and the rock oyster--all favorites of the sea otter--are to be found in the bay. So also are such other mollusks as whelks, mussels, chitons, and clams. Other sea life includes the sea cucumber, starfish, brittle stars, and sand dollars. In some places shrimp was observed in large concentrations, but the sea otter is not among those animals which relish that particular type of shellfish.

The diver has found the bottom of the bay rather rugged in terrain, with 40-foot underwater cliffs not unusual. This has made scientific sampling of the area a bit difficult. Also sampling an area in which the fauna was mobile was found to be much different from sampling areas in which mollusks were attached to each other and firmly to the bottom.

One sample, taken from the sea bottom nine feet square and in 50 feet of water, resulted in a catch of 255 specimens weighing a total of  $32\frac{1}{2}$  pounds. Mussels--127 of them--accounted for nearly 30 pounds of this. Then there were 56 sea urchins weighing just over a pound, 27 rock oysters, 37 clams, and 8 whelks.

The study is not sufficiently advanced to know the maximum depth limits at which an otter feeds but indications in other studies are that most of the feeding of this deep-diving sea mammal is done in water less than 25 fathoms deep. In Kuluk Bay, work to the present time has been confined to about half that depth.

The sea otter once could be counted by the tens of thousands in Alaskan and North Pacific waters. In one year alone, 1804, a shipment of 15,000 skins valued at one million dollars was shipped from Sitka, Alaska, to Russia. Heavy exploitation in the 1800's virtually exterminated the breed. Under the protection it has received in the past decades, the sea otter has made a promising comeback in Alaska and may be seen at other places along the Pacific Coast.



## Shrimp

Supply and Distribution of Shrimp, United States, 1953-58 (Based on Heads-On Weight)						
Item	1958 <sup>1</sup>	1957 <sup>2</sup>	1956	1955	1954	1953
.....(Millions of Pounds).....						
<b>Supply:</b>						
Domestic catch	212.0	203.9	224.2	244.4	268.3	260.4
Imports <sup>3</sup> /...	138.0	117.1	115.3	90.3	69.8	72.4
<b>Total.....</b>	<b>350.0</b>	<b>321.0</b>	<b>339.5</b>	<b>334.7</b>	<b>338.1</b>	<b>332.8</b>
<b>Disposition:</b>						
Canned .....	54.0	32.6	46.8	46.4	48.4	52.3
Dried .....	3.0	2.5	3.6	3.8	7.6	7.1
Frozen .....	238.0	231.6	226.3	208.3	197.8	188.4
Fresh .....	55.0	54.2	62.7	76.1	84.4	85.0
<sup>1</sup> /Preliminary. <sup>2</sup> /Revised. <sup>3</sup> /Mostly frozen headless and some frozen peeled shrimp meat. Also may include some fresh, canned, and dried. Round weight was determined by multiplying by 1.68. Note: To convert to headless weight divide by 1.68.						

**UNITED STATES SUPPLY AND DISTRIBUTION, 1953-58:** The total supply of heads-on shrimp (domestic and imported) available to the United States consumer amounted to 350 million pounds in 1958, an increase of 9.1 percent over the preceding year and about 4.2 percent above the average for the six-year period, 1952-1958. In 1958 the total available supply of heads-on shrimp consisted of 212 million pounds, or 60.6 percent, from domestic landings and 138 million pounds (39.4 percent) from imports. Imports are supplying an increasing share of the over-all United States shrimp supply. In 1953 domestic landings supplied 78.2 percent of the total shrimp supply of 333 million pounds.

The amount of shrimp utilized in the frozen form has steadily increased from about 188.4 million pounds in 1953 to about 238 million pounds in 1958. Most of the

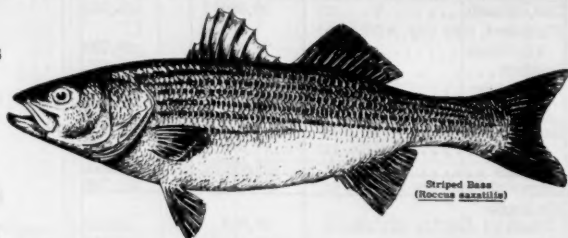
increase in the amount of shrimp frozen has occurred at the expense of the fresh shrimp. The quantity of shrimp canned has fluctuated according to the supply of the smaller sizes and the demand for shrimp for other uses, but the amount used for canning in 1958 was the highest in the past six years. The amount of shrimp utilized for drying has declined steadily since 1953.



### Striped Bass

**SURVEY SHOWS EXCELLENT CROP OF YOUNG IN CHESAPEAKE BAY:** There were 30 times as many young striped bass or rockfish taken in exploratory samples from nursery areas of Chesapeake Bay in the summer of 1958 than occurred in samples for the previous two years, biologists of the Virginia Fisheries Laboratory announced on February 16, 1959.

"Not only did unusual numbers of young striped bass appear in Virginia rivers during the past summer, but Maryland scientists also found an abundance of young fish in rivers up the Bay," a fishery biologist of the Virginia Laboratory stated. "These young fish should supply large stocks for both commercial and sports fishermen by 1960 when they will be about 14 inches long and should weigh about 1½ pounds," he predicted.



The biologist points out that success in breeding and survival of young fish usually plays a more important part in determining the abundance of striped bass than does the removal of large fish by the commercial or sports fishermen. Because both sport and commercial fishing is valuable to the economy of the Chesapeake Bay area, the Virginia Fisheries Laboratory has repeatedly emphasized that nursery areas for striped bass, shad, croakers, oysters, and crabs must be protected from pollution or changes of any kind which would be detrimental to marine animals if this natural resource is to maintain itself. Though there have been large fluctuations in striped bass abundance since 1900 there is no evidence that a decline in the striped bass population has occurred. Indeed, statistics show that almost twice as many rockfish have been caught since 1940 as during any similar period for which records are available.

The successful spawning of striped bass in 1958 is encouraging and should help compensate for the poor croaker spawning during the winter of 1957/58.



### U. S. Fishery Landings, 1958

Commercial fishery landings in the United States during 1958 amounted to 4.6 billion pounds--about 3 percent less than the 4.8 billion pounds taken in 1957.

The value of the 1958 catch was about \$380 million, or \$29 million more than in 1957 and \$11 million more than the record in 1956. The preliminary data also show that the canned pack of fishery products for human food in 1958 totaled 740 million pounds, an increase of 90 million pounds over 1957.

The heaviest decline in the catch was in the New England area where decreased haddock, whiting, and industrial fish landings helped to drop the annual harvest about 7 percent or 70 million pounds, and in the Middle Atlantic area where lower menhaden catches contributed to the 300-million-pound decrease in catch. While the catch of salmon was up in Alaska, production of herring declined and the total catch was about the same as in 1957.

To partially offset these losses, 1958 landings in Chesapeake Bay were up 43 million pounds, South Atlantic landings up 35 million pounds, and Gulf landings up 68 million pounds.

The catch off the California coast was up 29 million pounds and the catch off Latin America by California fishermen was 18 million pounds above that of 1957. In these instances the sardine and tuna harvests were largely responsible for the increase. The State of Washington had landings 27 million pounds in excess of the 1957 catch while Oregon fishermen held even with the previous year.

The principal decline by species were: menhaden landings were down 163 million pounds, New England industrial fish (excluding menhaden) down 73 million pounds, jack mackerel down 59 million pounds, Pacific mackerel down 39 million pounds, anchovies down 32 million pounds, whiting down 31 million pounds and haddock down 14 million pounds. Landings in 1958 were up for Pacific sardines almost four times and reached 202 million pounds--an increase of 156 million pounds over 1957. Salmon landings in the Pacific Coast States were up about 38 million pounds; tuna landings in continental United States were up 18 million pounds; ocean perch up 14 million pounds; pollock up 9 million pounds; and shrimp landings on the Atlantic, Gulf, and Pacific coasts (excluding Alaska) were up 6 million pounds.

Table 1 - United States Fishery Landings of Certain Species, 1958 and 1957

Species	1958 <sup>1/</sup>	1957
	.....(1,000 Lbs.).....	
Anchovies, Calif. ....	8,300	40,547
Cod, Atlantic ....	39,600	34,068
Flounders, New Eng. & Middle Atl. States ....	70,600	64,223
Haddock ....	119,100	133,571
Hake, white ....	4,200	5,745
Halibut, Pacific ....	47,900	49,899
Herring, sea:		
Alaska ....	86,000	118,290
Maine ....	160,000	153,621
Industrial fish, New England 2/	217,000	289,700
Mackerel:		
Jack ....	22,800	82,012
Pacific ....	22,900	62,044
Menhaden ....	1,527,200	1,690,128
Ocean perch, Atlantic ....	147,700	133,931
Pollock ....	30,800	22,034
Salmon ....	302,700	265,153
Sardine, Pacific ....	202,300	45,862
Tuna, Pacific Coast States:		
Albacore ....	37,100	46,659
Bluefin ....	30,900	20,315
Skipjack ....	118,500	90,821
Yellowfin ....	126,400	137,240
Total ....	312,900	295,035
Whiting ....	102,100	133,041
Crabs, Dungeness, Pac. States (excluding Alaska) ....	38,800	42,222
Lobsters, Maine ....	21,500	24,403
Scallops, sea ....	18,900	20,994
Shrimp (heads-on):		
South Atlantic States ....	22,700	28,590
Gulf States ....	175,000	168,453
Pacific Coast States (excl. Alaska) ....	10,000	4,431
Squid, California ....	7,500	12,449
Total all above items ..	3,718,500	3,920,446
Others not listed ....	907,500	858,012
Grand Total ....	4,626,000	4,778,458

1/Preliminary. 2/Excluding menhaden.  
 Note: Data principally are weight of fish and shellfish as landed except mollusks which are the weight of meats only.

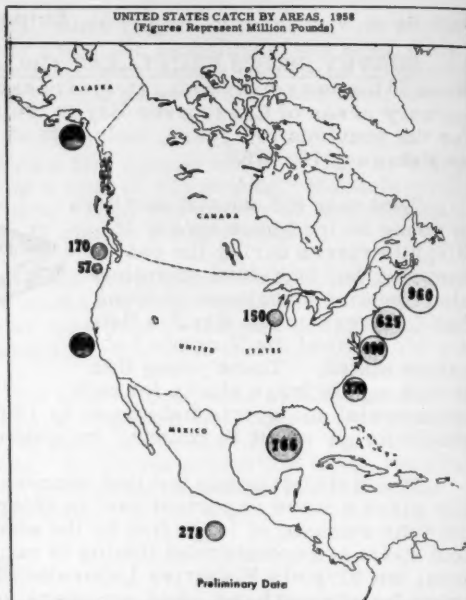


Table 2 - United States Fishery Landings by Areas, 1958 and 1957

Area	1958 <sup>1/</sup>	1957
	.....(1,000 Lbs.).....	
New England ....	960,000	1,031,000
Middle Atlantic ....	625,000	928,000
Chesapeake ....	490,000	447,000
South Atlantic ....	370,000	335,000
Gulf ....	766,000	692,000
Inland (Miss. River and Great Lakes areas) ....	150,000	153,000
California:		
off California ....	390,000	361,000
off Latin America ....	278,000	260,000
Oregon ....	57,000	57,000
Washington ....	170,000	143,000
Alaska ....	370,000	371,000
Total ....	4,626,000	4,778,000

1/Preliminary.



### United States Fishing Fleet <sup>1/</sup> Additions

**NOVEMBER 1958:** A total of 36 vessels or 5 net tons and over was issued first documents as fishing craft in November 1958. Compared with the same month of 1957, the total was the same for both years. The Gulf Area led with 12 vessels, the South Atlantic was second with 9; and Chesapeake was third with 6.

<sup>1/</sup>Includes both commercial and sport fishing craft.

Table 1 - U. S. Vessels Issued First Documents as Fishing Craft by Areas, November 1958

Area	November		Jan.-Nov.		Total
	1958	1957	1958 <sup>2/</sup>	1957 <sup>2/</sup>	1957
	(Number)				
New England . . . .	1	1	12	18	19
Middle Atlantic . .	1	1	13	22	23
Chesapeake . . . .	6	6	93	99	104
South Atlantic . . .	9	15	131	119	130
Gulf . . . . .	12	11	259	143	166
Pacific . . . . .	4	-	107	98	102
Great Lakes . . . .	3	2	9	7	8
Alaska . . . . .	-	-	31	47	48
Puerto Rico . . . .	-	-	-	1	1
Virgin Islands . . .	-	-	1	-	-
Total . . . . .	36	36	656	554	601

<sup>2/</sup>Revised.

Note: Vessels assigned to the various sections on the basis of their home ports.

sels--an increase of 102 vessels, or 18 percent, as compared with the same period of 1957. Of the vessels documented for fishing, 39 percent were reported from the Gulf States.



### U. S. Foreign Trade

**GROUND FISH FILLET IMPORTS, JANUARY 1959:** During January 1959 imports of cod, haddock, hake, pollock, cusk, and ocean perch fillets (including blocks) into the United States amounted to 19.1 million pounds--an increase of 8.7 million pounds or 83 percent as compared with January 1958.

Imports from Canada (8.3 million pounds) accounted for 44 percent of the month's total imports. Iceland was second (6.2 million pounds) for 33 percent, while the remainder (4.5 million pounds) for 23 percent was shipped in by 7 other countries.

The quota of groundfish and ocean perch fillets and blocks permitted to enter the United States at  $1\frac{1}{8}$  cents a pound in the calendar year 1959 is 36,919,874 pounds, based on a quarterly quota of 9,229,968 pounds. The quota for the calendar year 1958 amounted to 35,892,221 pounds. Imports during individual quarters in excess of the established quarterly quota enter at a duty of  $2\frac{1}{2}$  cents a pound.

Note: See Chart 7 in this issue.

\* \* \* \* \*

**SHRIMP IMPORTS, 1958:** United States imports of all shrimp (fresh, frozen, canned, and dried) from all countries in 1958 amounted to 85.4 million pounds as compared with 69.7 million pounds in 1957. Shrimp imports from Mexico in 1958 totaled 56.1 million pounds as compared with 47.9 million pounds in 1957.

Most of the imported shrimp is frozen except for some canned shrimp from northern Europe and some dried shrimp from Hong Kong and Japan.

The United States imported shrimp from 39 countries in 1958 as compared with 36 countries in 1957. Some notable increases occurred in the imports of frozen shrimp from El Salvador, Nicaragua, Costa Rica, Colombia, Argentina, Hong Kong, Australia, Korea, and Egypt.

Table 2 - U. S. Vessels Issued First Documents as Fishing Craft, by Tonnage, November 1958

Net Tons	Number
5 to 9 . . . .	17
10 to 19 . . . .	2
20 to 29 . . . .	5
30 to 39 . . . .	7
40 to 49 . . . .	3
80 to 89 . . . .	1
180 to 189 . . . .	1
Total . . . .	36

Fishing craft issued documents as fishing craft during the first 11 months of 1958 totaled 656 ves-



United States Shrimp Imports (Fresh, Frozen, Canned, and Dried), 1957-58					
Country of Origin			Country of Origin		
1958			1957		
(In 1,000 Lbs.)			(In 1,000 Lbs.)		
<b>Mexico by Customs District:</b>			<b>Ecuador . . . . .</b>		
Florida . . . . .	138	77		4,438	3,869
New Orleans . . . . .	2,871	3,668	Peru . . . . .	487	625
Laredo . . . . .	20,947	17,280	Chile . . . . .	163	46
El Paso . . . . .	29	1	Argentina . . . . .	606	138
San Diego . . . . .	1,718	760	Iceland . . . . .	16	64
Arizona . . . . .	30,334	25,792	Sweden . . . . .	21	8
Los Angeles . . . . .	61	310	Norway . . . . .	144	132
Hawaii . . . . .	-	15	Denmark . . . . .	46	21
Puerto Rico . . . . .	-	3	United Kingdom . . . . .	2	-
<b>Total Mexico . . . . .</b>	<b>56,098</b>	<b>47,906</b>	Netherlands . . . . .	1	-
British Honduras . . . . .	4	-	Western Germany . . . . .	86	7
Greenland . . . . .	41	11	Spain . . . . .	230	22
Canada . . . . .	263	243	Italy . . . . .	267	60
El Salvador . . . . .	1,129	65	Greece . . . . .	-	14
Guatemala . . . . .	39	-	Turkey . . . . .	5	3
Honduras . . . . .	836	-	Israel . . . . .	14	14
Nicaragua . . . . .	278	1	India . . . . .	1,700	1,250
Costa Rica . . . . .	717	228	Pakistan . . . . .	637	471
Panama . . . . .	7,917	8,378	Philippines . . . . .	5	3
Canal Zone . . . . .	193	42	Vietnam . . . . .	1	-
Bahamas . . . . .	4	8	Korea . . . . .	128	58
Cuba . . . . .	391	610	Hong Kong . . . . .	4,029	1,586
Netherlands (Antilles) . . . . .	-	19	Taiwan . . . . .	-	2
Colombia . . . . .	890	486	Japan . . . . .	2,552	2,887
Venezuela . . . . .	121	137	Australia . . . . .	362	178
Surinam . . . . .	82	65	Egypt . . . . .	450	40
			<b>Grand Total . . . . .</b>	<b>85,393</b>	<b>69,677</b>

Note: Also see Commercial Fisheries Review, April 1958, p. 43.

## Wholesale Prices, February 1959

Wholesale prices for selected edible fishery products in February 1959 were down slightly from the preceding month due primarily to lower prices for fresh drawn haddock and haddock fillets, fresh and frozen shrimp, and canned sardines. But compared to the same month a year ago, the February 1959 edible fish and shellfish (fresh, frozen, and canned) wholesale price index (133.7 percent of the 1947-49 average) was up 5.4 percent due to higher prices for fresh and frozen drawn and dressed fish, fresh and frozen fish fillets, fresh water fish, and canned Maine sardines.

The February 1959 price index for the drawn, dressed, and whole finfish subgroup was down 1.8 percent from the preceding month because of a drop in drawn haddock prices (-8.5 percent) and slight declines in prices for frozen red king salmon and halibut. These lower prices more than offset increases in the prices for whitefish and yellow pike. As compared with February 1958, the subgroup index for this February was higher by 24.7 percent because of price increases for all the commodities in the subgroup.

The fresh processed fish and shellfish subgroup index for this February was down 2.0 percent due to a decline in the wholesale prices for fresh haddock fillets (down 4 percent) and fresh shrimp (down 3.2 percent). Shucked oyster prices remained unchanged from January to February this year. The subgroup index in February 1959 as compared with February a year ago was up 4.5 percent. Higher prices for fresh haddock fillets (up 24.8 percent) and oysters (up 11.7

percent) more than offset a drop of 3.2 percent in fresh shrimp prices.

Because of lower frozen shrimp prices at Chicago, the February 1959 index for frozen processed fish fillets and shellfish was down slightly (1.1 percent) from the preceding month. Ocean perch and flounder fillet prices were unchanged, but haddock fillet prices were up 2.4 percent. From February 1958 to February this year the wholesale price index dropped 2.6 percent due to a decline of 8.2 percent in frozen shrimp prices at Chicago. The lower frozen shrimp prices more than offset a 5.0-percent increase in frozen fillet prices in February this year as compared with the same month in 1958.

From January to February 1959 the over-all canned fish subgroup index was about unchanged--slightly higher canned salmon prices just about balanced out lower prices for canned Maine and California sardines. The drop in the Maine sardine price was due to the sell-out of available stocks of the best-grade pack. Canned tuna prices were unchanged from January to February this year, but substantial promotional allowances are being offered to stimulate sales. As compared with the same month of 1958, prices for the selected canned fish products this February were lower by 3.2 percent. Higher Maine sardine prices (up 17.8 percent) were more than offset by a drop of 23.9 percent in the prices for California sardines and lower prices (down about 3 percent) for canned salmon and tuna.

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, February 1959 With Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices <sup>1/</sup> (\$)		Indexes (1947-49=100)			
			Feb. 1959	Jan. 1959	Feb. 1959	Jan. 1959	Dec. 1958	Feb. 1958
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned) . . . . .					133.7	135.4	134.8	126.9
<b>Fresh &amp; Frozen Fishery Products:</b> . . . . .					157.9	160.6	160.1	144.9
<b>Drawn, Dressed, or Whole Finfish:</b> . . . . .					170.9	174.1	177.5	137.0
Haddock, lge., offshore, drawn, fresh . . . . .	Boston	lb.	.21	.23	212.8	232.9	235.0	149.7
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.33	.34	102.6	103.7	104.2	97.5
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.77	.78	173.0	174.1	176.9	141.0
Whitefish, L. Superior, drawn, fresh . . . . .	Chicago	lb.	.77	.67	190.9	166.1	185.9	148.7
Whitefish, L. Erie pound or gill net, rnd., fresh	New York	lb.	.80	.73	161.8	146.6	182.0	128.4
Yellow pike, L. Michigan & Huron, rnd., fresh . .	New York	lb.	.74	.66	173.5	153.6	152.4	164.1
<b>Processed, Fresh (Fish &amp; Shellfish):</b> . . . . .					151.1	154.2	148.0	144.6
Fillets, haddock, sml., skins on, 20-lb. tins . .	Boston	lb.	.61	.63	205.9	214.4	211.0	165.0
Shrimp, lge. (26-30 count), headless, fresh . .	New York	lb.	.92	.95	145.3	150.1	139.0	150.1
Oysters, shucked, standards . . . . .	Norfolk	gal.	6.00	6.00	148.5	148.5	148.5	133.0
<b>Processed, Frozen (Fish &amp; Shellfish):</b> . . . . .					137.4	138.9	140.0	141.1
Fillets: Flounder, skinless, 1-lb. pkg. . . . .	Boston	lb.	.42	.42	108.6	108.6	108.6	103.4
Haddock, sml., skins on, 1-lb. pkg. . . . .	Boston	lb.	.42	.41	131.8	128.7	128.7	125.6
Ocean perch, skins on, 1-lb. pkg. . . . .	Boston	lb.	.31	.31	124.9	124.9	124.9	118.8
Shrimp, lge. (26-30 count), 5-lb. pkg. . . . .	Chicago	lb.	.87	.89	133.8	137.7	139.6	145.8
<b>Canned Fishery Products:</b> . . . . .					98.8	98.9	98.3	101.3
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs. . .	Seattle	cs.	22.25	22.00	116.1	114.8	112.2	120.0
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs. . . . .	Los Angeles	cs.	11.00	11.00	79.3	79.3	79.3	81.8
Sardines, Calif., tom. pack, No. 1 oval (15 oz.), 24 cans/cs. . . . .	Los Angeles	cs.	7.38	7.75	86.6	91.0	96.9	113.8
Sardines, Maine, keyless oil, No. 1/4 drawn (3-3/4 oz.), 100 cans/cs. . . . .	New York	cs.	8.22	8.47	87.5	90.1	90.1	74.3

<sup>1/</sup> Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.



### ICED FISH STORAGE EXPERIMENTS

Experiments conducted in Denmark have shown that when plaice are stored without ice at 5.3°, 0.6°, and -0.6° C. (41.5°, 33°, and 30.2° F.), the fish at the lowest temperature kept approximately twice as long as at the highest temperature. Iced fish, at nearly the same temperature (0° to -0.5° C. or 32° to 31.1° F.), kept 2 or 3 days longer. Temperature measurements on iced boxed fish have shown that when fish were exposed for 4 to 5 hours in an auction hall at 14° C. (57.2° F.), the temperature of the upper layers of fish rose to 5° or 6° C. (41° to 42.8° F.), while that of the lowest layers was 2° C. (35.6° F.) (Arsberetning fra Fiskeriministeriets Forsegslaboratorium for 1955, Copenhagen, Denmark.)



## International

### FISH OIL MARKET SITUATION IN WESTERN EUROPE, 1958

During 1957 and 1958, the fats and oils situation in Western Germany and the Netherlands changed from one of shortage to near saturation. Prices weakened and declined; buyers were reluctant during 1958 to purchase more than their immediate needs until the falling market stabilized. This was the general situation responsible for the sharp decline in United States exports of fish oils, according to trade sources in Hamburg and Rotterdam.

During the first 10 months of 1958, United States exports of fish oils were 29 percent below those of 1957 and substantially below those of 1956. This reduction in export trade was cause for concern to the United States industry which depends upon Western European markets as the main outlet for its production of menhaden oil.



A brief survey of the prospects for marketing fish oils in Western Germany and the Netherlands was made by a representative of the U. S. Bureau of Commercial Fisheries during mid-December 1958. He talked with leading fish-oil importers in Hamburg, Rotterdam, and London.

In general, the prospects for increased exports of fish oils to Europe in 1959 are more encouraging. Although prices for fats and oils had been on a decline since early in 1958, they were expected to stabilize about February 1959 after initial sales of this season's whale-oil production and establishment of prices for the large supplies of soybeans and soybean oils.

Menhaden oil prices were reported relatively high during the early months of 1958; buyers found

other oils more desirable, pricewise. If prices for menhaden oil line up competitively with other oils, exports should again approach the former volume. According to trade sources, the market in West Germany can use about 60,000 metric tons of fish oil from the United States annually. There are, however, some unfavorable aspects in the Western European situation which may cause a shift from menhaden oil to other types of edible oils for use in margarine.

The shortage of edible oils in Europe, under which the United States menhaden oil trade has prospered since the end of World War II, has ended. Menhaden oils can be readily replaced by other oils. Menhaden oil is less desirable as a margarine base than herring or pilchard oil because it requires more effort to harden. Fish oils, as a whole, contribute a relatively small portion of the total edible oils used in margarine in Western Europe.

In Europe, menhaden oil is used mainly in the production of margarine; it is mixed in the processing with other edible oils, including whale oil and vegetable oils. Menhaden oil is reported to be used in the lower-grade margarines. Major packers of margarine in the Netherlands and West Germany are aggressively promoting the sales of higher grades of margarine. This factor, coupled with the availability of larger supplies of vegetable oils and oilseeds, may adversely affect the sales of menhaden oil to Western European margarine processors.

**SITUATION IN WEST GERMANY:** German margarine production in 1957 amounted to 648,000 metric tons. Consumption of margarine in Germany has increased from 5.6 kilograms per capita in 1949 to 12.3 kilograms in 1957. The outlook for total margarine production shows stability, but consumption of the lower-priced quality product has declined substantially since 1955. This development has been stimulated by the introduction of new brands with improved consistency, taste, and packaging. This trend is expected to continue.

The trend towards higher-quality fats is attributed to rising consumer income; housewives are able and willing to pay relatively high prices for butter and the top-quality brands of margarine. Average prices for margarine remained stable; however, there was an increase in the price of the more expensive brands in 1957.

About 50 percent of the West German margarine supply is produced by one firm with plants in Ham-

## International (Contd.):

burg, Kleve, and Mannheim. An additional 10 percent is shared by smaller plants operating under contract with this firm. Trade reports indicate that a big advertising campaign and the introduction of a new brand has increased this firm's share up to 75 percent of the total German margarine supply.

More oilseeds are being crushed in Germany. Oilseeds imported during 1957 totaled 1,190,000 metric tons, compared with 700,000 tons imported in 1953. Imports of vegetable oils and fats increased from 202,000 tons in 1953 to 261,000 tons in 1957. World oilseed production has increased substantially in recent years and surplus supplies are a principal cause of declining oil prices. Stocks of fats and oils on hand January 1, 1958, of 195,700 metric tons were 19 percent higher than a year earlier.

In terms of oil value, coconut fat is the leader among the edible vegetable and marine oil consumed in Germany. Soybean oil is next, followed closely by cottonseed oil, and palm kernel fat and palm oil. Whale oil and fish oil are next.

Soybean imports of 627,000 tons in 1957 were 18 percent greater than in 1956. The United States supplied 98 percent of the total soybean imports. Soybean oil imports totaled 26,932 tons of which 11,728 tons were from the United States. Cottonseed oil imports of 119,000 tons were 22 percent greater. The United States supplied almost 100 percent of this quantity.

German production of edible fats and oils from domestic raw materials was as follows in 1956 and 1957:

	1957	1956
	(1,000 Metric Tons)	
Vegetable oils . . .	20.9	16.2
Marine oils . . .	20.7	19.7
Slaughter fats . . .	273.0	255.0
Butter . . . . .	279.9	273.9

West Germany produces mainly rape-seed. A market for domestic production is assured through Government regulation which obligates margarine producers to use rape-seed oil in the production of margarine. The degree to which the government fosters this type of program will also have a bearing on the use of United States fish oils. Some revision of the German program is reported under consideration.

West German imports of fish and marine-animal oils declined from 88,672 metric tons in 1956 to 66,210 tons in 1957. A further decline in imports of fish oils was noted in the first nine months of 1958. Of the 1957 total, imports from the United States totaled 28,528 tons. In the first nine months of 1958, fish oil imports from the United States declined further. Imports from South Africa increased substantially; smaller gains were noted in fish-oil imports from Iceland and Norway.

Whale-oil imports in 1957 amounted to 81,189 tons, of which 34,748 tons were from Japan, 32,151 tons from Norway, and 5,515 tons from the Netherlands.

Exports of fish oil from Germany total about 10,000 tons annually, reportedly shipped out of the

country at the end of the year for tax-saving purposes.

A considerably larger quantity of herring went to German reduction factories in 1957--14,962 metric tons as compared with 2,696 tons in 1956. The reduction industry received 37,904 tons of raw material

Table 1 - German Federal Republic Fish-Oil Imports by Principal Country of Origin, 1957-58

Country	Jan.-Sept.		Year
	1958	1957	
	(In Metric Tons)		
United States . . . . .	13,152	27,044	28,528
Angola . . . . .	5,002	6,851	10,749
Iceland . . . . .	2,625	1,371	5,786
Norway . . . . .	6,637	5,950	7,181
South Africa . . . . .	9,241	3,342	4,694
Other . . . . .	7,646	7,378	9,272
Total . . . . .	44,303	51,936	66,210

from the deep-sea fishery, and 76,949 tons from in-shore and coastal fisheries. In addition, 253,552 tons of offal were received. From all this, 20,734 tons of fish oil and 76,531 tons of fish meal were produced. In 1956, 19,738 tons of oil and 75,768 tons of meal were produced from 279,750 tons of raw material.

During January-September 1958, German fish-oil production totaled 13,156 metric tons, a decrease of 16.7 percent from the 1957 period. Fish meal production amounted to 56,829 tons, a decline of 4.5 percent. A smaller herring catch was largely responsible for the decline.

**SITUATION IN THE NETHERLANDS:** Supplies of fats and oils were reported generally adequate in the Netherlands; prices were weakened and falling--so no one was anxious to buy. Herring oil production in Europe has been low, but large quantities of pilchard oil were available from South Africa. Herring oil is more desirable in the trade generally, but the supply is sporadic and undependable. Importers like the constant supply feature of menhaden oil from the United States.

Table 2 - Netherlands Imports of Fats and Oils of Fish and Marine Animals (for domestic consumption), 1957-58

Origin	Jan.-Oct.		Year
	1957	1957	
	(In Metric Tons) . . . . .		
Sea-1/ . . . . .	33,859	20,188	23,497
Japan . . . . .	52	10,441	10,445
United States . . . . .	4,165	6,578	6,583
Union of So. Africa . .	288	3,014	3,023
Southwest Africa . . .	5,631	-	-
Australia . . . . .	1,124	-	-
Norway . . . . .	2,827	1,080	1,272
Falkland Islands . . .	1,042	1,148	1,478
Iceland . . . . .	187	999	1,000
Other . . . . .	3,624	3,028	3,759
Total . . . . .	52,799	46,476	51,057

1/ Believed to consist of whale oil taken at sea.  
Source: Central Bureau of Statistics.

Netherlands butter production increased in 1957, and margarine production leveled off in its climb. A factor of some importance in the trade, which caused some setback in the margarine industry, were the sizable sales of cold-storage butter. Here, as in Germany, the leading firm put on an extensive promotional campaign for its top-grade margarine. The campaign, according to trade sources, made special mention that the new margarine contained no fish oil.



## International (Contd.):

Imports of soybeans in 1957 totaled 186,356 metric tons as compared to 176,373 tons in 1956. Other imports during 1957 for margarine use were 180,049 tons of copra and 104,218 tons of palm kernel.

Regulations aimed at protecting the domestic oil-seed crushing industry continued to favor that operation. Domestic producers of edible fats were shielded against low-priced processed animal fats by means of a monopoly levy of .30 guilders per

Table 3 - Netherlands Fish and Marine-Animal Oil Production, 1953-58				
Year	Fish Oil	Whale Oil	Sperm Oil	Stocks Jan. 1
	(Metric Tons)			
1958	n.a.	n.a.	n.a.	13,299
1957	3,936	2,891	40	9,246
1956	4,048	4,942	2,526	14,506
1955	4,979	5,679	77	24,645
1954	5,347	15,376	1,016	13,045
1953	5,135	17,345	30	n.a.

n.a. = not available.

kilogram (about 3.6 U.S. cents a pound). Argentina sold some sunflower seed oil at extremely low prices but the Netherlands government tried to counteract the unfavorable effect on Dutch crushers by means of subsidy to that industry.

Netherlands imports of fats and oils of fish and marine animals for domestic consumption were slightly higher in 1958 than in 1957. Smaller imports were received from the United States, but increased imports came from South Africa.

In addition to imports, transshipments of fish oils and other marine-animal oil in 1957 amounted to 39,563 tons. Of this, 10,583 tons was from the United States destined for West Germany; 11,822 tons from Angola to West Germany; and 3,411 tons from the Union of South Africa to West Germany.

**COMMON MARKET:** Concerning the effects of the Common Market on fish oil imports, this trade will depend largely on what happens to margarine in the agreements yet to be negotiated. Belgium and France are not large users of margarine, but the Netherlands and Germany are. Under the Common Market, which came into effect January 1, 1959, fish oil will remain free of duty--at least until 1962. There is no telling what may happen at that time. If applied in 1962, duties on fish oils will increase gradually until in 12 years they would reach the full agreement rate. Trade sources indicate the duty could go up to about  $4\frac{1}{2}$  percent by 1974. A more important aspect of the situation is what may happen to the supply and prices for soybeans and cottonseed oils--as well as other competitive oils--and their duty status under the Common Market.

**SITUATION IN ENGLAND:** British oil buyers are unable to buy from the United States because of the 10-percent duty on fish oil in the United Kingdom. One large trader was rather optimistic about the prospects for continued sale of menhaden oil to Europe.

The market was rather unsettled at the moment due to the uncertainty of the price for whale oil from the past season, according to British sources. Whale oil prices generally set the level that can be paid for fish oil.

## FOOD AND AGRICULTURE ORGANIZATION

MEETING ON FISHERY COOPERATIVES:

A technical international meeting on fishery cooperatives will be held in Naples, Italy, May 12-21, 1959. The Food and Agriculture Organization of the United Nations (FAO) is in charge of arrangements for the meeting.

An interesting and diversified agenda has been planned by FAO. As a means of providing a practical background to the conference, a series of visits will be arranged to fishery cooperatives and fishing centers in the vicinity of Naples.

Working papers will cover: Fishery Cooperatives in Europe; Fishery Cooperatives in North America; Prospects for Cooperative Action in Fisheries; Government and Other Services Related to Fishery Cooperatives; Cooperative Education and Training; and Cooperative Business Organization and Methods in Fisheries.

Participants will include representatives of both government fishery services and the cooperative movement itself.

The success of the meeting, it is believed, will depend a great deal on securing a balance between participants who are responsible for government cooperative programs and those who are professionally engaged in cooperative management and business activities.

FAO's budget allows for defraying costs of sponsoring the conference but does not include funds to assist those who wish to attend the meeting.

## INTERNATIONAL PACIFIC HALIBUT COMMISSION

HALIBUT REGULATIONS FOR 1959:

The International Pacific Halibut Commission has recommended to the United States and Canadian Governments that all North Pacific halibut fishing areas except Area 3B shall be opened to fishing May 1, 1959 (6 a.m. P.S.T.), and that Area 3B shall be opened April 1, 1959 (6 a.m. P.S.T.).

The fishing areas shall be the same as in 1958: Area 1A--south of Heceta Head, Oregon; Area 1B--between Heceta Head and Willapa Bay, Washington; Area 2--between Willapa Bay and Cape Spencer, Alaska; Area 3A--between Cape Spencer and Shumagin Islands; Area 3B--waters west of Area 3A, including Bering Sea.



## International (Contd.):

In Area 1A there shall be one fishing season, without catch limit, extending from May 1 to 6:00 a.m. October 16 or to the closure of Area 3A, whichever is later.

In Area 3A there shall be one fishing season, with a catch limit of 30 million pounds, commencing on May 1 and terminating at the time the catch limit is attained.

In Area 3B there shall be one fishing season, without catch limit, extending from April 1 to October 16 or to the closure of Area 3A, whichever is later.

In Area 2 there shall be two fishing seasons as in 1958, except that the Cape Scott and Goose Islands grounds in Queen Charlotte Sound at the north end of Vancouver Island and the inside waters of southeastern Alaska shall be closed to halibut fishing during the second season.



Large halibut being loaded in the hold of a halibut fishing vessel in the North Pacific. Metal cans are used to save the livers which are used to make fish-liver oil.

In Area 2 the catch in the first season shall be limited to 26.5 million pounds. The second fishing season in Area 2 shall begin at 6:00 a.m. August 22, for a period of 7 days without a catch limit.

In Area 1B there shall be two fishing seasons, identical in duration to those in Area 2, and without a catch limit.

The grounds in Area 2 off Masset at the north end of Queen Charlotte Islands and off Timbered Islet off the west coast of Prince of Wales Island in Southeastern Alaska, which had been closed for a number of years prior to 1958, shall again be open in 1959.

The Commission held its 35th Annual Meeting in Seattle the latter part of January. The Commission is responsible to Canada and the United States for the investigation and regulation of the halibut fishery of the northern Pacific Ocean and Bering Sea. Its specific function is the development of the stocks of halibut to levels that will permit the maximum sustained yield, and its decisions regarding regulations are based upon the findings of its scientific staff.

Since in the past the United States and Canadian Government have accepted the recommendations of the Commission without changes, it is fairly certain that the 1959 regulations will be approved by the two Governments as recommended by the Commission.

Notes: Also see Commercial Fisheries Review, Apr. 1958 p. 49, June 1958 p. 55, Aug. 1958 pp. 56 & 112, Oct. 1958 p. 43.

## NORTHWEST PACIFIC FISHERIES

## JAPANESE-RUSSIAN CONFERENCE:

The third Japan-U.S.S.R. conference on northwest Pacific fisheries (underway in January 1959), spent its first week debating the order of the agenda, the Soviet Union wishing to have regulations and conservation measures taken up before the setting of Japan's catch quota, while Japan wanted the order of these items reversed. A compromise was reached under which the two matters were to be taken up "parallel."

The second week of sessions was largely taken up with Soviet statements of violations of the Commission's regulations by Japanese fishing boats. The Soviet side cited 111 cases of alleged violations, while the Japanese reported on 77 violations apprehended by their authorities. The Commission adopted a resolution urging the signatory powers to tighten their enforcement machinery.

**Salmon Catches:** The conference published figures on the 1958 salmon and king crab catches of both nations. Japan's salmon fisheries took a total of 181,854 metric tons of all species of salmon, while the catch for the Soviet Far East was only 73,000 tons. The detailed breakdown of the Japanese catch shows that Japan took 110,145 metric tons within the Japanese-Russian treaty area and 50,728 metric tons south of the treaty area. Japanese coastal fisheries produced 20,981 metric tons of salmon. The salmon catch of the Soviet Far East is reportedly the lowest in the past 25 years, and less than half of the 1957 catch of 150,000 tons. The decline was especially great in Kamchatka, where only 13,800 tons were taken. The Soviet red or sockeye salmon landings were 1,000 tons, as compared with 3,500 tons in 1957 and 5,800 tons in 1958.

**King Crab Production:** Japan's crab cannery vessels took 9,958,000 king crabs and met their production target of 320,000 cases of canned crab. The U.S.S.R. fleets packed only 340,000 cases out of a planned 480,000 cases, and the two fleets left the fishing grounds early because of poor catches.

International (Contd.):

## WHALING

### JAPAN ANNOUNCES CONDITIONAL WITHDRAWAL FROM CONVENTION:

Conditional withdrawal from the International Whaling Convention was announced by Japan on February 5, 1959. Towards the end of 1958 the Norwegian Government and early in 1959 the Netherlands Government also announced their conditional withdrawal from the Convention.

Since the International Whaling Convention and Schedule of Whaling Regulations is deposited with the United States Government, Japan said it would notify the United States of its withdrawal after formal Cabinet approval. The Convention was signed at Washington, D. C., December 2, 1946, and entered into force November 10, 1948.

Norway on December 29, 1958, and the Netherlands on December 31, 1958, sent formal notices of withdrawal to the United States Government. Withdrawals are to become effective on June 30, 1959, unless the nations engaged in pelagic whaling in the Antarctic do not reach agreement on a proportionate distribution of the maximum whale quota allowed by the International Whaling Commission.

Dissatisfaction among whaling countries with the quota system, which restricts the total number of whales killed in any one season, led to five-power talks in London in November 1958 when it was agreed that 20 percent of the quota should be allocated to the U.S.S.R. The balance of the quota was to be divided among Britain, Norway, Japan, and the Netherlands, but those countries could not reach agreement on an equitable division.

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### UNITED KINGDOM WILL NOT WITHDRAW FROM INTERNATIONAL WHALING CONVENTION:

The British Minister of Agriculture, Fisheries and Food was asked in the House of Commons on January 29 to state the Government's policy with regard to the International Whaling Con-

vention now that Norway, the Netherlands, and Japan have given conditional notices of withdrawal. He replied as follows:

"Her Majesty's Government have reviewed the position arising from the actions of the Government of Norway and the Netherlands in giving notices of withdrawal from the International Whaling Convention to take effect on 30th June this year for the 1959-60 whaling season if agreement is not previously reached upon the allocation, as recommended by the London Whaling Conference of November last, of the Antarctic catch authorised under the Convention.



"Her Majesty's Government have considered very seriously in the light of representations from the British whaling industry whether they should take similar action but have decided that the objectives of proper conservation of the whale stocks and the rational conduct of Antarctic whaling would best be served if Her Majesty's Government remain party to the Convention while striving to bring the recommendations of the London Whaling Conference into effect. In their view the Convention is the most satisfactory instrument for ensuring proper conservation, and the recommendations of the London Whaling Conference should provide the best means of securing the rational conduct of Antarctic whaling as between the industries of the several participating countries. These two objectives must be mutually supporting.

"If unfortunately the recommendations of the London Whaling Conference should not be put into effect Her Majesty's Government would be obliged to consider whether the present International Whaling Convention would remain workable.

## International (Contd.):

If the position should be reached that a Convention no longer fully representative of the Antarctic Whaling countries was failing to secure the conservation of the whale stocks, and at the same time the necessary conditions for the rational conduct of the industry could not be provided, there must be serious doubt whether Her Majesty's Government could continue to remain a party to the Convention. Furthermore, their attitude to any alterations in the arrangements for the regulation of whaling under the Convention that may meantime be proposed will necessarily be governed by the need to avoid prejudice to the position of the British whaling fleets in comparison with any others that might be operating free of the Convention."

Noter Also see *Commercial Fisheries Review*, March 1959 p. 58, February 1959 p. 49.



## Argentina

## JAPANESE TUNA VESSEL LANDS SECOND TRIP AT MAR DEL PLATA:

The Japanese tuna fishing vessel *Eisei Maru*, fishing out of Mar del Plata and under contract to the Mar del Plata Chamber of Fish Industries, landed its second trip of tuna on February 2, 1959. The trip of 130 metric tons, consisting of yellowfin, big-eyed, and albacore tuna, was caught in the St. Helena Island area. The trip also included some swordfish.

The first trip of 45 tons of tuna was landed on December 17, 1958, at Mar del Plata. The catch included about 25 tons of albacore and was taken in three days' fishing in the same general area as the second trip.

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## FISHING INDUSTRY TRENDS, 1957-1958:

**Landings and Consumption:** The Argentine fishing industry in 1957 continued to play only a minor role in the country's economy. While the total catch of salt-water fish and shellfish reached a new peak of 71,723 metric tons, 12 percent greater than that of 1956, it was only 1 percent greater than the previous peak catch established in 1955. The fresh-

water catch for 1957 was 8,957 metric tons of which about 4,000 tons was used for human consumption. (See tables 1 and 2,)

Table 1 - Landings of Salt-Water Fish and Shellfish in Argentina, by Species, 1956-1957

Species	1957	1956
(Metric Tons)		
<b>Fish:</b>		
Merluza (hake) . . . . .	22,789	21,467
Caballa (mackerel) . . . . .	19,295	10,455
Anchoita (anchovy) . . . . .	8,817	10,575
Tiburón (shark) . . . . .	3,643	3,333
Pescadilla (small hake) . . . . .	2,740	2,708
Pejerrey (variety of mackerel) . . . . .	1,129	989
Besugo (sea bream) . . . . .	1,004	799
Corvina . . . . .	873	2,067
Comalito (variety of mackerel) . . . . .	816	1,149
Others . . . . .	5,613	6,048
<b>Total fish . . . . .</b>	<b>66,719</b>	<b>59,590</b>
<b>Shellfish:</b>		
Mejillon (variety of mussel) . . . . .	2,827	3,190
Langostino . . . . .	1,338	1,940
Camaron (small shrimp) . . . . .	237	531
Other . . . . .	602	566
<b>Total shellfish . . . . .</b>	<b>5,004</b>	<b>6,227</b>
<b>Total fish and shellfish . . . . .</b>	<b>71,723</b>	<b>65,817</b>

The outstanding obstacle to the fuller development of Argentina's fisheries resources is the lack of domestic consumer demand. The per capita consumption of fish in Argentina in 1957 was about 7.4

Table 2 - Landings of Fresh-Water Fish in Argentina, by Zones, 1956-57

Zone	1957	1956
(Metric Tons)		
Various, for industrial use . . . . .	5,039	4,959
Rio Parana, for consumption . . . . .	1,471	1,805
Lakes " " . . . . .	1,592	1,274
Rio de la Plata " " . . . . .	762	608
Rio Uruguay " " . . . . .	82	83
Rio Paraguay " " . . . . .	11	12
<b>Total . . . . .</b>	<b>8,957</b>	<b>8,741</b>

pounds, as compared to an estimated per capita meat consumption (beef, mutton, pork) of around 250 pounds a year.

The principal reasons for the low consumption of fish in Argentina are its high cost, as compared to beef, its lack of availability to most potential consumers, public distrust of the product's freshness, and the public's traditional preference for beef. It has been calculated that in the Greater Buenos Aires area, the principal market for seafood, there are only 26 fish markets and 130 open-air fish stands while the same area has over 8,000 meat markets. The lack of adequate refrigerated transport and distribution facilities, aside from limiting wider distribution, hampers the presentation of a product

## Argentina (Contd.):

capable of attracting greater consumer interest in the principal market areas.

Recognizing the need to increase the consumption of fishery products in order

would transport salt-water fish to various parts of the country where it is now practically unavailable. As a result of this program, three municipally-owned trucks are now being used as mobile fish markets in the Buenos Aires area. The Government's decree establishing two

Table 3 - Argentine Exports and Imports of Fishery Products, 1956-57

	1957		1956	
	Quantity	Value	Quantity	Value
	Metric Tons	US\$	Metric Tons	US\$
<b>Exports:</b>				
Fresh fish .....	0	0	0.7	800
Fresh shrimp .....	244.8	177,466	45.6	13,800
Fish in oil .....	215.1	98,947	56.0	25,900
Fish otherwise conserved .....	38.4	17,012	17.8	4,100
Total exports .....	498.3	293,425	120.1	44,600
<b>Imports:</b>				
Cod .....	43.3	30,586	0.0	0
Oysters, fresh .....	0	0	0.8	900
Lobster, live .....	3.0	6,400	2.2	6,300
Herring, smoked and in brine ..	11.7	3,126	0.0	0
Sardines in oil or sauce .....	24.8	19,380	0.0	0
Other canned fish & shellfish ..	43.3	38,938	7.1	8,000
Total imports .....	126.1	98,430	10.1	15,200

to provide greater supplies of beef for export, the Secretary of Agriculture and Livestock in October 1958 announced plans for improving distribution facilities

"meatless days" per week may also result in a greater consumption of fishery products.

Table 4 - Argentine Exports and Imports of Fish by Countries, 1957

Country	Exports	Imports
	(US\$)	
United States .....	158,644	106
Paraguay .....	40,183	0
Cuba .....	37,549	0
Uruguay .....	19,334	0
Bolivia .....	17,698	0
Peru .....	8,599	0
Poland .....	5,329	0
Brazil .....	1,879	0
Netherlands .....	1,806	48
United Kingdom .....	1,385	12,567
U. S. Possessions .....	352	0
Canada .....	328	0
Italy .....	310	2,422
Chile .....	29	11,343
Spain .....	0	39,102
Norway .....	0	19,936
Portugal .....	0	11,275
Others .....	0	1,631
Total .....	293,425	98,430

for fresh fish. These plans foresaw the construction of a cold-storage plant in the fishing port of Mar del Plata and the outfitting of 80 refrigerated trucks which

**Foreign Trade:** While many businessmen in the industry see little hope for substantial improvement in the internal market during the next few years, the prospects for exports (see tables 3 and 4), however small they have been to date, appear to warrant more optimism. While exports of fish in 1957 amounted to only US\$293,425, less than 0.03 percent of the country's total exports for the year, they were nevertheless seven times greater in dollar value than in 1956. The larger part of the increase was in frozen shrimp, most of which went to the United States. During the first 3 months of 1958, over US\$200,000 worth of fish were exported, of which \$127,000 was contributed by shrimp shipments.

During October 1958 an Argentine company with United States capital participation, commenced production of frozen shrimp and fillets of sea trout (pescadilla) in its new plant at Rawson, Chubut, for export to the United States. The plant reportedly has a freezing capacity of one million pounds a month and is said to be processing some 200,000



## Argentina (Contd.):

pounds a month of shrimp and of sea trout at present. The product is shipped by refrigerated truck to San Antonio Oeste, thence by refrigerated rail car to the port of Buenos Aires where it is exported.

Other export prospects are raised by the tuna fishing activity being developed by a Japanese company. After investigations made by the company during 1958 indicated the presence of schools of tuna as far south as the 35th parallel, the company sent a Japanese tuna fishing vessel, the Eisei Maru, to fish the area, using Mar del Plata as its home port.

The Eisei Maru arrived in Mar del Plata from Japan on December 17, 1958, and landed some 45 metric tons of tuna, including 25 tons of albacore. The tuna was reportedly caught during 3 days of fishing in waters between St. Helena Island and Brazil. The vessel is expected to make one trip a month and to catch around 150 tons per trip. A contract has been signed between the company and the Mar del Plata Chamber of Fish Industries for the Chamber to buy the vessel's catches for processing in Mar del Plata canneries. Statements by chamber and government officials indicate that the Argentines intend to export canned tuna produced in this venture to the United States. An Argentine Government fishing official, who traveled on the Japanese vessel from Capetown to Mar del Plata for observation purposes, reported on arrival that tuna fishing prospects are "magnificent."

**Vessels and Gear:** Few changes have occurred in the Argentine fishing fleet and gear. Aside from the generally stagnant condition of the industry's domestic market, import restrictions and the shortage of foreign exchange have continued to hamper the obtaining of new equipment and for repair and replacement. One observer in the industry has remarked that the Argentine fishing fleet has only one modern, first-class trawler, the Taiko Maru 22, owned by a Japanese-Argentine company.



## Australia

TUNA CATCH GOOD OFF  
NEW SOUTH WALES:

"Compared with last year, twice the quantity of fish has been taken in half the time," was the comment respecting the tuna run on the south coast of New South Wales, made by the Manager of a large cannery on November 18, 1958.

In one period of two days, he said, the catch had exceeded 230 metric tons--172 tons on one day and 65 tons the next. A restriction on landings for 5 or 6 days was inevitable, but actually only about two days' fishing was lost, as bad weather would have prevented fishing anyway. Lack of sufficient initial freezing room to cope with the exceptional landings had caused the restriction, and to ease the situation some of the fish was shipped to Sydney.

Provision of additional quick-freezing space in the future is a possibility. However, landing restrictions occur about only one week in a year. The remainder of the year enough tuna cannot be supplied to keep up with cannery capacity.

The New South Wales tuna run was expected to end about mid-December, when the fish usually go southwards, towards Lakes Entrance. (Australian Fisheries Newsletter, December 1958.)

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TUNA FISHING SEASON  
IN 1958 SETS RECORD:

The cumulative tuna catch on the south coast of New South Wales through December 12, 1958, was 1,597 metric tons.

The manager of the canneries at Eden and Narooma said the season had almost ended for that area, and the fish were moving south.

The 1957 catch was about 1,000 tons, and the manager said the 1958 season total was about 600 tons better than the previous record. A feature of the season's operations was that the large volume of fish caught had taken up only about half the fishing time required in



## Australia (Contd.):

previous years. (Australian Fisheries Newsletter, January 1959.)

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#### QUEENSLAND SHRIMP EXPORTS UP IN 1958:

The market for Queensland shrimp in the United States was further developed, and the processing of shrimp and fish was further advanced, the Queensland Fish Board stated in its report during the year ended June 30, 1958. To the date of the report a record 259,850 pounds of headless shrimp had been exported for the season to the United States, compared with 65,550 pounds in 1957 and 32,700 pounds in 1956. (Australian Fisheries Newsletter, December 1958.)

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#### NEW SOUTH WALES SHRIMP REGULATIONS:

The New South Wales law fixing the minimum legal length for shrimp is to be rescinded from May 1, 1959, from

AUSTRALIAN SHRIMP  
TRAWLER



which date the minimum mesh size of trawl nets will be increased from  $1\frac{1}{4}$  inches to  $1\frac{1}{2}$  inches. The amendments are based on the findings by the Marine Biologist of the State Fisheries Department, who recently completed an investigation of shrimp fisheries in Eastern Australia.

The Superintendent of Fisheries said that the new controls would increase the harvest of shrimp. Under the new controls, the fishermen would be expected to cull their catch into three grades--small, medium, and large--otherwise the catch would be sold as ungraded. To avoid any likelihood of having nets seized as being undersize, fishermen are urged to buy only nets with a mesh of not less than  $1\frac{1}{4}$  inches (Australian Fisheries Newsletter, January 1959).



#### Brazil

##### JAPANESE FISHING COMPANIES OPERATING OUT OF BRAZILIAN PORTS:

At the present time there are two Japanese fishing companies actually engaged in fishing operations out of Brazilian ports. A third company is expected to commence operations this year and a joint Brazilian-Japanese company is engaged in whaling. These active branches of large Japanese fishing companies operate at the present time 9 long-liners, 4 trawlers, 1 purse seiner, and 2 whaling vessels.

One of the Japanese firms is authorized by the Brazilian Hunting and Fishing Division of the Ministry of Agriculture to enter and supply with fish the ports of Northern Brazil and the Federal District. The firm is authorized to have eight long-liners and is based in Recife. The marketing of the catches is made by a jointly-owned Brazilian-Japanese fish distribution firm. The Japanese are reported to own about 40 percent of the capital of this distribution firm. In addition to Recife, this company services the ports of Belem, Fortaleza, Natal, and Rio de Janeiro.

The Recife-based fishing company is believed to be fishing off the northeastern

## Brazil (Contd.):

Brazilian coast from July to January. The fishing grounds extend from a point about 200 miles north of the Amazon and seaward several hundred miles. The grounds are relatively narrow, and probably are in an area where cold water is upwelling to the surface. From February to June fishing operations are reported to take place south of Fernando de Noronha in the latitudes between Cabo Sao Roque and the Sao Francisco River.

A second company is authorized by the Ministry to fish in any waters and supply fish to any Brazilian state or territory. At present, this company operates from Santos and supplies only the State of Sao Paulo. Four trawlers (three of 100 tons and one of 180 tons), one long-liner, and one purse seiner are fishing for this firm. The purse seiner is reported to have a hold capacity of about 230,000 pounds. In addition to the present fleet, this firm is authorized to bring in three more long-liners of 780 tons each for tuna fishing during 1959. The trawlers fish off the coast of Santa Catarina and Rio Grande do Sul while its long-liner operates off the Pernambuco coast.

The joint Brazilian-Japanese whaling company operates the two whaling vessels out of Cabedelo, state of Paraiba.



## Canada

## GOVERNMENT TO PAY BOUNTY FOR DOGFISH LIVERS:

As a result of pressures brought by British Columbia fishing organizations, the Canadian Government has provided C\$130,000 in the form of special bounties to aid in the elimination on the West Coast of the predatory dogfish shark.

The dogfish, which have been increasing considerably in recent years, have resulted in heavy losses of food fish as well as damage to fishermen's nets. Local fishermen will receive a bounty of 10 cents a pound for dogfish livers that are delivered to processing plants in Vancouver or Prince Rupert, B. C.

In addition, the Federal Department of Fisheries will charter five trawlers to help in eliminating the dogfish menace. The fish caught will become the property of the Government of Canada for such disposal as may be directed.

The Fisheries Association of British Columbia has announced that an annual kill of at least 30,000 tons of dogfish must be made in order to reduce the damage caused food fish.

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## PROGRESS REPORT ON CONTROL OF SEA LAMPREY IN GREAT LAKES:

A comparatively lamprey-free area has been found in the middle of Lake Superior by Canadian fisheries scientists and has been designated as a preserve for lake trout. It is part of Canada's campaign as a member of the Great Lakes Fishery Commission with the United States to re-establish lake trout populations in the Great Lakes. Over the years lamprey have been preying on commercially-important lake trout and whitefish stocks in most of the Great Lakes, and a coordinated plan of attack on this predator is being conducted by Canada and the United States.

The Fisheries Research Board of Canada is the agency which carries out lamprey control in Canadian waters and general fisheries research in Lake Superior. In his report to the annual meeting of the Board, the Director of the Board's Biological Station at London, Ont., reported on



SEA LAMPREY FEEDING ON A TROUT.

lamprey research conducted during 1958. Experimental fishing on the Superior Shoal indicated that the lake trout population there showed much less evidence of lamprey attacks than do most trout populations in the lake. These findings supported earlier reports on the basis of which the shoal was closed to commercial fishing and designated as a preserve in which trout might survive to assist in rebuilding their numbers which have been markedly reduced by the sea lamprey.

Although some chemicals hold out considerable promise in the eradication of the sea lamprey from the Great Lakes, work is still progressing with electrical barriers to stop the lamprey from reaching spawning areas in streams flowing into the Great Lakes. Most of Canada's research work on the sea lamprey is carried out in Lake Superior and Lake Huron. As far as has been possible, all Canadian tributaries to Lake Superior, which are suspected of being important sea lamprey spawning streams, were intensively searched for young lamprey. All major lamprey producers have been blocked by barriers. Investigations seem to indicate that some of the streams previously suspected of being lamprey producers do not have the environment necessary for successful reproduction of lamprey populations.

## Canada (Contd.):

A survey of more than 800 tributaries in Lake Huron was completed in 1958; nearly 2,000 have now been surveyed and 40 lamprey-producing streams have been discovered. The data collected are suitable for use in planning lamprey control either by electrical barriers or by lampricides.



## Ceylon

FRESH-WATER FISHERIES  
BEING DEVELOPED:

Some interesting problems arising from the development of the fresh-water fisheries in Ceylon are reported by Dr. Shao Wen Ling, a Chinese fisheries biologist, who is on a four-year assignment in the island. Ling was sent to Ceylon by the Food and Agriculture Organization (FAO), Rome, when the Government requested the services of an expert to advise on the development of brackish and fresh-water fish culture in Ceylon.

"This assignment was not just a matter of surveying the brackish and fresh-water resources, deciding the best type of fish to cultivate, and training Sinhalese workers to develop the industry," Ling explained, in an interview at FAO Headquarters early in 1959. "I have done this part of the work but I also found there were social problems to be faced.

"For example, Ceylon is predominantly a Buddhist country and the Buddhist religion objects to any form of killing, so we had some difficulty in finding people of the inland areas who would actually do the fishing," he continued. "This problem has been partially overcome by persuading the coastal fishermen, who are not Buddhists, to move inland during their off-season and try fishing in the inland waters. As they made good catches, some of them decided to remain and we now have about 50 families working on the lakes, rivers, and reservoirs which we have been stocking with carp and gourami."

Meanwhile, under the technical supervision of the expert, the Government has built 40 ponds, covering about 10 acres, for rearing young fish for release in the

inland waters, and 20 ponds for breeding purposes. Ling has trained two senior counterpart officers and 20 field workers to run the Government ponds. Some 50 private individuals have also taken up fish culture in ponds they have built under guidance from the FAO expert and his counterparts.

"We found, however, that hatching, raising, and harvesting the fish was not the end of our work and problems," Ling pointed out. "Since people in the inland areas are not accustomed to fresh-water fish, a large proportion of the catch has to be processed and presented in diversified forms such as salted, dried, or smoked fish. These products are now beginning to appeal to the potential consumers although a good deal of educational work and persuasion will be necessary to establish these fish products as commonly-accepted food. But, no doubt, that will come about as the industry slowly expands."

The carp used were imported from Thailand and gourami from Malaya. "I think it is fair to say that, with these fish and the development work we have done, the basis has been laid for a fresh-water fish industry in Ceylon," Ling said.

Ling has been temporarily assigned to the United States, where there has been a considerable interest in fish farming in recent years, especially among rice farmers. Problems have arisen, particularly in connection with fish diseases. Ling is being sent by FAO, at the request of the United States Government, to consult with experts of the United States Fish and Wildlife Service on these matters.



## Chile

## LICENSING REGULATIONS FOR FOREIGN FISHING VESSELS PROPOSED:

The Chilean Government has started to take tentative measures to end the awkward situation of requiring foreign fishing vessels to obtain permits to fish in Chilean waters, while at the same time making such permits impossible to

**Chile (Contd.):**

obtain due to failure to issue the necessary regulations, states a recent dispatch from the United States Embassy in Santiago.

The Sub-Secretary of Agriculture has announced a project entailing a series of administrative restrictions to prevent overfishing and to preserve Chilean sovereignty over territorial waters. Foreign fishing vessels would be required to obtain and exhibit previous authorizations from the Department of Hunting and Fishing of the Ministry of Agriculture and would have to receive this permission from their ports of origin.

Fishing rights would require a registration fee of \$200 plus \$12 a ton on each vessel's tonnage. Limitations or prohibitions would be placed on the fishing of albacore, anchovies, and sardines and the use of explosives, poisonous materials, and drag nets. The proposals must still be approved by the Minister of Agriculture and the President.

**Colombia****AMOUNT OF BOND REQUIRED FOR SHRIMP FISHING PERMIT REVISED:**

On January 21, 1959, the Colombian Government by Decree No. 0199 amended Clause b of Article 8, Decree No. 1409 of 1958. This amendment provides for the amount of bond that must be posted in order to obtain a permit for shrimp fishing. The amounts to be posted are as follows:

1. A fixed sum of Ps 150,000 (US\$20,775) plus Ps 10,000 (US\$1,385) for each boat for fishing companies having 15 or more boats.
2. A fixed sum of Ps. 80,000 (US\$11,080) plus Ps 10,000 (US\$1,385) for each boat for fishing companies having 5 to 15 boats.
3. A fixed sum of Ps 10,000 (US\$1,385) plus Ps 10,000 (US\$1,385) for each boat for fishing companies having less than 5 boats.

The Decree also establishes fines from Ps 1,000 (US\$138.50) to Ps 100,000 (US\$13,850) for anyone who violates the above provisions, the United States Embassy in Bogota reported on January 27, 1959.

Note: Pesos converted at rate of 7.22 pesos = \$1.

**Costa Rica****SPINY LOBSTER LANDINGS LOWER IN 1958:**

A sharp decline occurred in Costa Rica's 1958 spiny lobster catch from the Caribbean coast off Puerto Limon. Practically all of Costa Rica's spiny lobster landings are taken in that area. The catch in 1958 was estimated at only about 5,000 pounds, a sharp drop from the 165,000 pounds caught in 1957. The spiny lobster fishing season usually runs from October to January.

Officials of the Ministry of Agriculture and Industries are concerned over the sharp decline in the spiny lobster catch and are reported to be preparing legislation designed to prevent the extermination of that shellfish. Local fishermen have been unable to explain the reason for the unusually small 1958 catch. Based on the relatively large catch in 1957, a number of local interests invested sizable sums in small boats and equipment for the 1958 lobster season. Because of the unusually small catch much of this investment was lost.

In recent years there has been some exportation by air of spiny lobster, primarily to the United States. Lobster exports in 1957 were about 44,000 pounds, valued at US\$23,000. Export figures for 1958 are not yet available. For several years, the National Production Council has guaranteed the price of spiny lobster by establishing a minimum price which it will pay for all spiny lobsters brought to the Council's freezers.

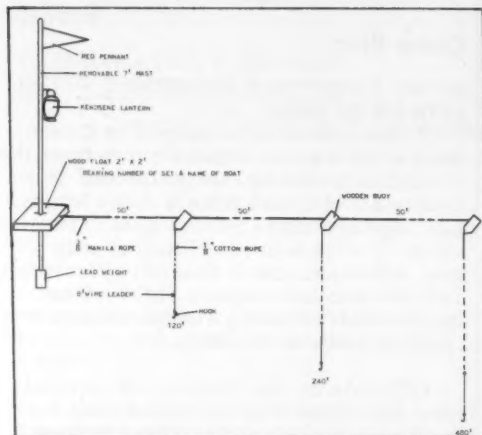




## Cuba

### FISHING RIG USED BY SHARK FISHERMEN AT COJIMAR:

Fishermen leave Cojimar Harbor, Cuba, around 11 p.m. in open power boats 18-24 feet in length. As a rule two men comprise the crew and the boat carries 10-12 floating fishing rigs (see diagram)



Fishing rig used by shark fishermen Cojimar, Cuba.

of 3 hooks each which are baited with shark fillets just before they are placed in water 1 to 4 miles offshore. Each hook is attached by an 8-foot wire leader to a  $\frac{3}{8}$ -inch cotton rope which hangs suspended from a wooden buoy. The hooks of one set hang at different levels in the water, usually at 20, 40, and 80 fathoms. The wooden buoys, spaced 50 feet apart, are joined to each other by a  $\frac{3}{8}$ -inch manila rope which is attached at one end to a square wooden float bearing the name of the boat, the number of the set, and a 7-foot removable mast carrying a lantern and flag.

As a rule 10 sets of 3 hooks each are placed in a straight line, each set being 100-200 yards from the next and numbered consecutively 1-10. After the sets are all placed, they are patrolled until dawn to make sure they are not lost. Sharks are removed at daybreak and if the weather is fair, a set may be rebaited. Boats return to Cojimar Harbor between 11 a.m. and 3 p.m. with their sets and catch; they leave again the same evening at 11 p.m. if weather permits.



--Perry W. Gilbert,  
Professor of Zoology,  
Cornell University.

## Denmark

### FISHERY TRENDS, 1958:

**Landings:** For the ninth successive year the Danish landings (preliminary estimates) increased in both weight and value. In 1958, the catch was about 1,295.5 million pounds, valued at 328 million kroner (US\$47.5 million), as compared with 1,159.6 million pounds, valued at 290 million kroner (US\$42 million) in 1957. Landings by foreign vessels in Denmark amounted to 136.7 million pounds, almost triple the 1957 landings of 46.3 million pounds. More important was the increase that occurred in landings of fish which are important foreign-exchange earners.

For the first time in many years herring supplanted plaice as first in value. The herring catch was 648.2 million pounds, valued at 76 million kroner (US\$6.9 million), as compared to the 1957 catch of 454.1 million pounds, valued at 51 million kroner (US\$7.4 million). In 1958 the plaice catch rose 2.2 million pounds to 68.3 million pounds and the value was up 3 million kroner (US\$434,000) to 63 million kroner (US\$9.1 million). About half the herring catch was taken in the North Sea, and 90 percent of it was used for the production of fish meal and oil.

Production figures on pond trout, which encountered some export difficulties in 1958 because of Japanese and Israeli competition, were not announced. The 1958 export value was 35 million kroner (US\$5.1 million) for 11 million pounds.

The catch of tobis (launce or sand eel) was about 165.3 million pounds, 98 percent of which was taken in the North Sea.

In 1958 the cod catch was 130.1 million pounds, valued at 38 million kroner (US\$5.5 million); in 1957, 119.0 million pounds, valued at 33 million kroner (US\$4.8 million).

**Byproducts:** In 1958 Denmark produced 145.5 million pounds of fish meal and 33.1 million pounds of fish oil, compared to 121.3 million pounds of meal and 28.7 million pounds of oil in 1957.

**Consumption:** Domestic consumption of fish in 1958 may have increased slightly over the 1957 per capita average of 28 pounds, since landings for consumption



## Denmark (Contd.):

increased by 2.2 million pounds over 1957.

**Fishery Loans:** The fisheries bank almost exhausted its credit authorization of 30 million kroner (US\$4.3 million) by granting during 1958 loans for 60 new vessels totaling 6 million kroner (US\$869,000), and many smaller loans for engines and repairs. Of the loans for new vessels, 30 were for cutters over 20 tons in weight.

**Fishing Fleet:** During the year, 29 Danish fishermen out of a total of 17,500 lost their lives at sea. The fishing fleet was valued at 324 million kroner (US\$4.7 million) at year's end, and was estimated to contain about 50 steel cutters, with many more now under construction.

**Common Market:** The Danish fishing industry has expressed itself as not particularly concerned about the initial effect of the onset of the Common Market on Danish fish exports. There was more concern over the exclusion of fish and fish products from the proposed Nordic Customs Union, and in September 1958 a special committee of the Nordic Council recommended that import taxes and duties on fish be abolished among the Nordic countries and a common external tariff established, at the same time as removal of the quantitative import restrictions. Denmark adhered to this proposal and hopes it will be accepted, but reserved adhering to the one point proposed that there be free access to direct landings in any participating country. Obviously, Denmark wishes to profit by her preferred geographical position in relation to the European market. For this same reason Danish fishermen are protesting the recently-established ferry route from Kristianssand, Norway, to Hirsthals on Jutland, which will give Norwegian fish easy access to the direct route to Germany.



## East Africa

**TUNA STOCKS IN INDIAN OCEAN STUDIED:**

With seven miles of long line baited with 250 large fish hooks and set at depths up to 50 fathoms, the East African Marine Fisheries Research Organization floating laboratory *Manihine* has begun to study the stocks of tuna in the Indian Ocean off the East African coast.

First results have been promising, and the Organization's Director says the vessel has carried out fishing which would be commercially economic, some of it comparable with the catches from long-line fishing by the Japanese.

Two cruises off the Kenya coast, the Director stated, yielded 29 big tuna weighing 3,750 pounds (caught on 130 hooks on a shortened line) and many other fish, including sharks and marlin were lost as the line was hauled back. The catches suggest that coast anglers might well try to find marlin (the *Manihine* caught 13 striped marlin some distance below the surface).

Long-lining has been carried out in the Indian Ocean by Japanese fishing boats for some time, sometimes with a thousand hooks on a 30-mile long line. Four years ago one Japanese ship, fishing 200 miles off the East African coast, caught between 8 and 9 fish for every hundred hooks set.

The Organization's Director, whose headquarters are at Zanzibar, says the tuna caught off the East African coast is usually yellowfin, found all over the world in tropical and subtropical waters.

One of the common methods used in tuna fishing is trolling on the surface of the sea, but Japanese and American research has shown that big shoals of tuna exist well below the surface, especially where there are sudden water temperature drops (thermocline) over a few fathoms. They have also found that the thermocline attracts rich layers of plankton, squid, and small fishes on which the tuna feed.

The Research Organization, a service of the East Africa High Commission, has charted the depth of the thermocline, which varies with the monsoon, and the *Manihine*, carrying a bathythermograph to determine the depth of the thermocline, has been setting her long-lines at the right depths, from the surface down to 50 fathoms. Each mile of long line has 35 hooks, baited with sardine or mackerel-type fish weighing from 2-4 ounces, or with small "changuus" fish which can be caught all the year round.

Several of the *Manihine*'s cruises produced good catches like those of the Japanese, 8 or 9 fish to every hundred hooks, but some cruises produced less than one fish per hundred hooks, although the lines were laid in the same areas.

There are still many problems for the scientists to solve before they can say with accuracy that long-line fishing off the coast is commercially possible. They have still to find out at what depths the tuna are distributed, and if they are there throughout the year. They also want to know why catches vary at certain times and places.

The Organization's scientists are tackling the problem by research into the water masses and currents of the Indian Ocean off the East African coast, the depth and the local variations of the thermocline, the food tuna feed on, the fertility of the water-mass close to the thermocline, and its consequent effect on the rich food layer, and the breeding and spawning seasons of the tuna.

The scientists aboard the *Manihine* examine the contents of the stomach of each tuna caught. The examination tells the scientists the depth at which tuna can usually be found at different times of the year, judged from the food they have been eating.

Many more cruises by the *Manihine* will be made before the jig-saw puzzle of tuna habits, and an accurate assessment of the commercial fishing possibilities can be provided, the United States Consul at Nairobi stated in a February 9, 1959, dispatch.

## Egypt

## FISHING INDUSTRY, 1957:

Although the Egyptian Government has indicated its desire to develop the commercial fishing industry, a few plans have

other inland waters is of considerably more importance and totaled 44,269 tons in 1957 (table 2). Fishermen engaged in the commercial fisheries totaled 57,550 in 1957 (table 3).

Table 1 - Egypt's Landings of Fish and Shellfish from Red Sea and Mediterranean Sea, 1957

Species	Mediterranean Sea	Red Sea	Total
..... (Metric Tons) .....			
<b>Fish:</b>			
Goatfish ( <i>Mullus barbatus</i> )	1,392	505	1,897
Sardines ( <i>Sardinella clupei</i> )	5,000	632	5,632
Mullet ( <i>Mugil</i> sp.)	130	729	859
Groupers ( <i>Epinephelus</i> sp.)	196	893	1,089
Red porgy ( <i>Pagrus spinifer</i> )	586	15	601
Jack (Caranx sp.)	-	298	298
Flying gumards ( <i>Dactylopterus</i> )	230	-	230
Cutlass fishes ( <i>Trichiurus</i> )	-	570	570
Sciaenids ( <i>Sciaenidae</i> )	1,716	152	1,868
Sharks & skates	390	70	460
Other species	1,167	1,307	2,474
<b>Total fish</b>	<b>10,807</b>	<b>5,171</b>	<b>15,978</b>
<b>Shellfish:</b>			
Shrimp ( <i>Penaeus</i> sp.)	2,724	103	2,827
Crabs	550	117	667
Sepia	442	254	696
<b>Total shellfish</b>	<b>3,716</b>	<b>474</b>	<b>4,190</b>
<b>Total fish &amp; shellfish</b>	<b>14,523</b>	<b>5,645</b>	<b>20,168</b>

been implemented. The estimated landings of fish and shellfish from the Mediterranean and Red Seas in 1957 amounted

The principal processed fishery product is shrimp. Two large and several small firms in Alexandria produce frozen and cooked shrimp. The entire pack is exported to Italy, the United States, Switzerland, and Greece. The shrimp pack in 1957 was about 350 metric tons, valued at about US\$338,896 (118,000 Egyptian pounds). The shrimp fishing and packing industry is believed to have a large potential, but at present, shore-side capacity greatly exceeds the supply. As of the end of 1958, very little progress had been made in increasing the shrimp catch, in spite of the value of this resource as an earner of foreign exchange.

No canned fish were packed in Egypt during 1957. A plant that packed sardines in previous years was inactive. Negotiations were under way late in 1958 with the Japanese for the establishment

Table 2 - Egypt's Fish and Shellfish Landings at Lakes and Inland Waters, 1957

Species	Lakes					Nile	Total
	Mariout	Monzalaha	Brullog	Edkou	Qanun		
	(Metric Tons)						
Tilapia sp.	3,773	10,581	5,300	1,940	1,500	1,700	24,794
Mullet ( <i>Mugil</i> sp.)	116	4,959	1,700	985	963	-	8,723
Clarias anguillaris	100	1,149	550	125	-	990	2,914
Catfish ( <i>Pagrus bayad</i> )	-	261	190	-	-	590	1,041
Common eel ( <i>Anguilla anguilla</i> )	111	645	650	330	-	660	2,396
<i>Synodontis schall</i>	-	18	160	-	-	210	388
Shrimp ( <i>Penaeus</i> sp.)	-	858	270	-	-	-	1,128
<i>Sciaenids aquila</i>	-	270	180	-	-	-	450
Other species	-	478	-	620	-	800	2,435
Total	4,100	19,219	9,000	4,000	3,000	4,950	44,269

to 20,168 tons (see table 1). The catch of fish and shellfish from the lakes and

Table 3 - Employment in Egypt's Commercial Fisheries, 1957

	Red Sea	Med. Sea	Lakes	Nile	Total
Men	2,050	9,500	17,500	11,500	40,550
Boys	1,000	4,500	8,500	3,000	17,000
<b>Total</b>	<b>3,050</b>	<b>14,000</b>	<b>26,000</b>	<b>14,500</b>	<b>57,550</b>

of a large sardine canning factory. Some dried and salted fish are produced in Egypt for domestic consumption (United States Consulate in Alexandria, November 6, 1958).



## El Salvador

MEXICAN SHRIMP VESSEL  
FINED FOR ILLEGAL FISHING:

On December 30, 1958, as troubles were developing between Mexican shrimp fishing boats and the Government of Guatemala, a 76-ton Mexican shrimp vessel,

the San Andres, was taken into custody by Salvadoran authorities in the vicinity of La Libertad, charged with fishing without license, and then taken to La Libertad (where the boat and crew were held in custody). Of two other boats with the

## El Salvador (Contd.):

San Andres, one got away and a second one, which was being towed by the San Andres, cut loose en route to La Libertad and made its escape. A few rifle shots were reportedly fired (high) at some point during the proceedings.

According to the Government of El Salvador's published version, the three boats were caught fishing about one mile off the Salvadoran coast and chased out to about four miles before the San Andres was captured. Another version is that the boats were not fishing at the time, but were en route to fishing grounds off El Salvador or Nicaragua, although admittedly no more than some eight miles off-shore (El Salvador claims sovereignty out to 200 nautical miles).

At La Libertad, the boat's cargo of shrimp (about 1.5 metric tons) was impounded and the boat and crew were held for several days pending payment of the US\$2,000 fine imposed under the 1955 Fishing Law. The crew was apparently neither mistreated nor put in jail. On January 8, 1959, the Mexican Chargé d'Affaires, having received the necessary funds from the Mexican owners, paid the fine and the vessel was released.

The Salvadoran Government has not yet issued any additional fishing licenses, so the Salvadoran fishing fleet remains at some 16 boats operating out of the Salvadoran ports of El Triunfo and La Union. Although additional licenses have been requested, the Government is hesitating to issue any additional licenses until it can have a technical study made of Salvadoran fishing waters to determine whether operation of additional boats would deplete Salvadoran shrimp beds.



## France

## CANNED SARDINE PACK, 1957:

Landings of sardines on the French mainland during 1957 totaled 14,513 metric tons. Of this total, the canning

industry packed 6,100 tons on the Atlantic coast and about 1,000 tons on the Mediterranean shores.

According to statistics issued by the French Canner's Federation, the canneries produced about 330,000 cases from sardines landed by French vessels and about an equal quantity, if not more, from imported sardines.

The total pack of canned sardines on the French mainland in 1957 was about 700,000 cases. Adding the total pack for 1956--1,700,000 cases--we arrive at a total of 2,400,000 cases for 1956-57 or an annual average of 1,200,000 cases. This pack was sufficient to supply the normal market demands, taking into consideration the imports of canned sardines during 1956-57. (Industrias Pesqueras, Vigo, Spain, December 1958.)

\* \* \* \* \*

## LARGEST TUNA FISHING VESSEL LAUNCHED:

From the shipyards at Dieppe, France has launched its largest tuna freezership, the Gambi. Its dimensions are: length, 139 feet; beam, 23 feet; depth of hold, almost 13 feet; and tonnage, 400 tons.

The vessel has a storage capacity of 300 tons in its 10 refrigerated compartments. The Gambi and a sistership, now under construction, will fish for tuna off the African coasts and will operate in the Gulf of Gascony during the summer seasons. (Boletín de Información, Sindicato Nacional de la Pesca, No. 2, November 1958, Madrid, Spain.)



## Greece

## DEVELOPMENT OF ATLANTIC OCEAN FISHERY:

Greece will have 12-14 trawlers fishing in the Atlantic Ocean by the fall of 1959. This fleet of vessels is expected to produce about 20,000 metric tons of fish.

Although fish supplies in the Greek market will be much more abundant, increased landings from the Atlantic may create a marketing problem.

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## Greece (Contd.):

## SPONGE FISHERY, 1958:

Sponge production by Greek fishermen in the summer of 1958 amounted to 93.5 metric tons (table 1).

Table 1 - Greek Sponge Production, 1957-58		
	1958	1957
	(Metric Tons)	
Greek waters . . . . .	32.6	41.0
Cyrenaica . . . . .	31.0	25.6
Tripolis . . . . .	6.0	28.2
Egypt . . . . .	16.4	20.5
International waters . . . .	7.4	-
Total . . . . .	93.4	115.3

The total value of the sale of the 1958 sponge production as landed amounted to Drs. 35,500,000 (US\$1.2 million) or an average of Drs. 486.30 per oke.

The decline in sponge production from 1957 to 1958 resulted in a drop in value of 23 percent. (Alieia, January 1959.)



## Iceland

## FISHERY LANDINGS, 1958:

Icelandic fishery landings in 1958 were substantially greater than in 1957 and and 1956. Cod was the leading species landed.

Table 1 - Icelandic Fishery Landings by Principal Species<sup>1/</sup>, 1956-58

Species	1958	1957	1956
	... (Metric Tons) ...		
Cod . . . . .	235,448	201,161	234,186
Haddock . . . .	18,735	20,083	16,172
Ling . . . . .	3,304	2,684	2,988
Catfish . . . . .	9,547	8,824	5,684
Ocean perch . .	109,920	61,552	58,578
Coalfish . . . .	11,891	14,376	18,913
Cusk . . . . .	4,615	3,386	3,072
Herring . . . . .	107,318	117,495	100,465
Other . . . . .	4,260	6,766	3,637
Total . . . . .	505,038	436,327	443,695

<sup>1/</sup> Weights are gutted fish with heads-on, except herring which are whole or round.

In 1958 ocean perch landings were greater than herring landings, the first time this has occurred. Herring landings were less than in 1957 but greater than 1956.

Table 2 - Icelandic Fishery Catch by Type of Vessel, 1956-58

Type Vessel	1958	1957	1956
	... (Metric Tons) ...		
Motorboats . . .	305,893	280,781	269,953
Trawlers . . . .	199,145	155,546	173,742
Total . . . . .	505,038	436,327	443,695

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## UTILIZATION OF FISH LANDINGS, 1958:

As in previous years, the bulk of Iceland's fish landings in 1958 of white fish was utilized for producing frozen fishery products. Herring landings in 1957 were used principally for reduction to produce fish meal and oil, but in 1958 the bulk of the herring was used for producing salted herring because of the good demand for that product on the world market.

Icelandic Fish Catch Utilization <sup>1/</sup> , 1956-58			
Product	1958	1957	1956
	... (Metric Tons) ...		
<b>White Fish:</b>			
Fresh on ice, exported direct	9,826	17,314	18,283
For freezing . . . . .	258,251	179,855	164,363
For stockfish (wind-dried) . .	41,740	34,477	47,635
For salting . . . . .	77,395	77,867	100,782
For reduction . . . . .	5,162	5,958	8,486
Other <sup>2/</sup> . . . . .	5,346	3,561	3,676
Total . . . . .	397,720	318,832	343,230
<b>Herring:</b>			
For freezing . . . . .	15,938	12,024	12,909
For salting . . . . .	53,460	27,155	51,358
For reduction . . . . .	37,920	78,316	36,198
Total . . . . .	107,318	117,495	100,465
Grand Total . . . . .	505,038	436,327	443,695

<sup>1/</sup> Weights are gutted fish with heads on, except herring which are whole or round.  
<sup>2/</sup> Primarily for domestic consumption.

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## WINTER TRAWL FISHERIES TRENDS:

Severe storms off the Newfoundland and Labrador coast in late January and early February 1959 forced most of the Icelandic trawlers to return, many with only partly-filled holds. In Icelandic waters, gales kept the motorboats in port for most of the first half of February, and when the weather permitted fishing, catches were poor. The hopeful estimates



## Iceland (Contd.):

of the first three weeks of January, when catches were averaging one-third better than in the similar period of 1957, had to be revised, the United States Embassy in Reykjavik reported in dispatches dated February 13 and 27.

An Icelandic daily newspaper stated, "that the Icelandic trawlers now face the necessity of operating in the home fishing grounds for the next few months, and the likelihood of catching practically no fish. It cannot be denied that the extension of the fisheries limit creates difficulties for the trawlers. It is the motorboats which chiefly enjoy the benefits of the extension."

But in the latter half of February, the motorboats were able to go out, and catches were reasonably good. The trawlers, which have been fishing, even during the bad weather, off the northwest peninsula of Iceland, at first had moderate catches outside the 12-mile limit, but in the last few days of February struck rich schools and averaged 30 metric tons a day as compared to a seasonal average of about 20 tons during last winter, which was itself considered good.

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#### BRITISH VESSEL FINED FOR FISHING WITHIN TERRITORIAL WATERS:

The first trial of a foreign trawler captain since Iceland extended its fishing limits to 12 miles, on September 1, 1958, took place in Seydisfjörður, eastern Iceland, on February 7. The skipper of the British trawler *Valafell* pleaded guilty to fishing illegally inside the four-mile Icelandic fishing limits and was fined 74,000 kronur (about US\$4,500). His gear and fish catch were confiscated.

The *Valafell* had surrendered on instructions from its owners after tossing for nearly five days in the stormy waters off the east coast of Iceland with an Icelandic Coast Guard patrol boat and two British frigates standing guard, while the British Naval commander awaited orders from the Admiralty.

The Icelandic defense counsel pointed out to the court that British recognized neither the four- nor the 12-mile fishery limit and declared that the verdict would therefore be appealed. Bond of 220,000 kronur (about US\$13,500) was posted to enable the trawler to depart. At the conclusion of the trial the commander of the patrol boat that made the arrest entered in the record a statement that the commander of the British frigate *Agin-court*, which originally had prevented the arrest but later escorted the *Valafell* into port, had behaved in a most gentlemanly manner and had honored every promise to the letter.

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#### MOTORBOAT FISHERMEN'S DISPUTE SETTLED:

The threatened tie-up of the motorboat fishing fleet at three of the chief fishing ports, Reykjavik, Hafnarfjörður, and the Westmann Islands late in January was averted after fringe benefit concessions by the Government and the operators. But the line was held on the main issue of the seamen's share price, which is now 1kr. 1.91 per kilo for cod (about 6.15 U.S. cents a pound) and which will drop to 1kr. 1.66 per kilo (about 4.6 U.S. cents a pound) when the new wage reduction law takes effect.

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#### FAROESE FISHERMEN'S UNION END BOYCOTT:

The prolonged efforts of the Icelandic motor-vessel owners to persuade Faroese seamen to come to Iceland have been successful. With the aid of press and radio, the Icelanders have managed to explain the wage terms to the Faroese public. A better understanding of the contract, plus the effect of unemployment in the Faroe Islands, has finally broken down the boycott imposed by the Faroese Seamen's Union, and 350 men are coming. Iceland has not yielded on the union's demand for a reduction in the foreign currency surcharge.





## Israel

## ISRAELI-JAPANESE TUNA FISHING COMPANY EXPANDS:

Following the recent successful marketing of tuna in Israel, the joint Israeli-Japanese fishing company, which is operating the Japanese tuna vessel Shinyo Maru on a charter basis, is expected to place an order for two 500-ton vessels of its own, according to a statement by a spokesman of the company. It is understood that the two tuna vessels will probably be built in Japan at a cost of \$500,000 each and sail under the Israeli flag. These vessels will be acquired by the Japanese partners in the fishing company and by a group of Swiss-Jewish investors with the participation of local capital. It is expected one or both of the new tuna vessels will fish in the Indian Ocean with Eilat as the home port. They are expected to bring in about 2,000 metric tons of tuna annually, and should pay for themselves within a period of 4-5 years. Following advertisements in a newspaper, 160 Israelis have already applied to work on the tuna vessel and the hiring of local crews is therefore not expected to present any problem.

The first catch of 240 tons of tuna brought to Israel in December 1958 by the Shinyo Maru was rapidly sold on the Israeli market; half of it fresh, and the remainder for smoking and canning. In the near future, the Japanese tuna vessel is expected to dock with another trip and it is hoped that with supplies coming in more regularly, the price of the tuna may be reduced. At present, the Israeli authorities are favoring tuna over imports of fish fillets.

The Israeli-Japanese fishing company also reports on a successful trial shipment of smoked tuna to France and Switzerland and is now shipping an additional sample order of 1.5 tons. Several tons of tuna livers for processing into oil by local laboratories are due to be landed by the Shinyo Maru from its present fishing trip. These experiments are designed to replace in the future cod-liver oil imports at a saving of about \$400,000 per annum.



## Japan

## SEEKS TO INCREASE FROZEN CRAB MEAT CONSUMPTION:

A project for increasing crab meat consumption is under way in Japan. Until recently, canning has been used for preserving crab meat, but according to Japanese experts, crab meat can be successfully and advantageously preserved by freezing. The Japanese plan to pack frozen crab meat in eye-appealing packages. They expect the frozen product to sell at a lower price than the canned. This is expected to increase consumption by placing crab meat within easy reach of many consumers for whom canned crab meat is a luxury.

Large-scale preservation by freezing will also be applied to langostinos, shrimp, and other crustaceans.

The prospects for the success of this project are thought to be excellent. Increased consumption is expected to stimulate efforts to increase catches. This will also help satisfy the large domestic demand for crab meat. (Puntal, Alicante, Spain, December 1958.)

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## MARINE OILS DEMAND AND SUPPLY FOR FISCAL YEAR 1958:

The Japanese fats and oils demand and supply program was revised by the

Table 1 - Japan's Use of Marine Oils, Fiscal Year 1958/

Product	Used for Food	Industrial Use	Export	Total
	(Metric Tons)			
Whale oil . . . . .	20,400	5,000	82,680	108,080
Fish oil . . . . .	12,000	9,000	-	21,000
Sperm oil . . . . .	-	27,000	12,800	39,800
Total . . . . .	32,400	41,000	95,480	168,880

1/ Ends March 31, 1959

Table 2 - Japan's Revised Plan for Production of Whale and Sperm Oil, Fiscal Year 1958

Product	Production	Exports	Domestic Consumption
	(Metric Tons)		
Whale Oil:			
Antarctic (actual).	88,758	81,758	7,000
Arctic (plan) . . .	12,320	920	11,400
Coastal (plan) . . .	2,000	-	2,000
Total . . . . .	103,078	82,678	20,400
Sperm Oil:			
Antarctic (actual).	18,394	12,783	5,611
Arctic (plan) . . .	11,610	-	11,610
Coastal (plan) . . .	6,000	-	6,000
Carry-over stocks	-	-	3,800
Total . . . . .	36,004	12,783	27,021

## Japan (Contd.):

Ministry of Agriculture and Forestry and the Ministry of Trade and Industry for the fiscal year 1958 (ended March 31, 1959). The revision for marine oils is shown in the tables.



## Republic of Korea

LANDINGS AND EXPORTS  
OF FISHERY PRODUCTS, 1958:

In 1958, South Korea's landings of fishery products amounted to 395,000 metric tons, a decrease of 8,000 tons from 1957. Landings of fish and shellfish in 1958 were up 15,000 tons, but the production of seaweed and other products declined about 23,000 tons.

Exports of marine products totaled 11,000 tons in 1958. These exports were valued at US\$3.6 million, or about 22 percent of the dollar value of all exports. Compared with 1957, the exports of marine products increased about 500 tons, but were lower in value by about \$560,000. In terms of value, the chief export items were cuttlefish, fresh and live fish, agar-agar, and seaweed. The principal customers for Korea's marine products were Japan and Hong Kong.

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## FISHERIES TRENDS, JANUARY 1959:

As part of South Korea's Fisheries Development Program which is aided by technical advisors of the International Cooperation Administration, three vessels from the Korean Fisheries Experimental Station carried out offshore shrimp exploitations on the east coast in the Pohang area during January. Catch rates, in deep water (160 meters or about 87 fathoms) indicated that it is commercially profitable to fish for shrimp in deep water with the trawling equipment introduced by the development program. Local fishermen are being taken on the vessels as observers in these operations. There are at least thirty vessels in the Pohang area which could be converted to this type of shrimp fishery. It is estimated that the production from these thirty vessels could be as high as 12,000 pounds of headless shrimp per fishing day.

The tuna long-line vessel *Ji Nam Ho* returned to Pusan from American Samoa on December 23, 1958, after a cruise of 11 months. This vessel has been discharging tuna to an American-owned cannery at Samoa. A complete report of the cruise and a financial report on operations are being prepared by the owners.

The success of the new type vessels and seining equipment, introduced by the Fisheries Development Program, has encouraged local investors to start new vessel construction. These vessels are following a similar design and will be equipped in the same manner as the first dem-

onstrator vessel. It is expected that eight new vessels of this type will be ready for sea in April 1959. If they produce as well as the demonstration vessel did in 1958, it will mean an additional 24,000 metric tons of fish for the Korean economy.

The regulations governing sanitation, quality, and inspection of frozen fishery products for export, prepared with the assistance of the fisheries technicians, were promulgated by the Minister of Commerce and Industry on December 26, 1958. Initial inspections of processing facilities are being made preparatory to certifying those plants which meet the required standards. Announcement of certification will be made later.

The demonstration fish meal plant at the Pusan Experiment Station made its first test run at the end of December. Some operating difficulties are being corrected and the plant readied for operation.

A Korean "Frozen Seafood Export Association" has been formed. Its members will include all producers and/or exporters of frozen seafood who have approved plants. Office space has been set up and management personnel have been employed. The association has been endorsed by the Office of Marine Affairs and has been delegated by the Ministry of Commerce and Industry as the recognized export agency. A brand name for frozen seafoods has been selected and drawings for the trade mark and package printing are being prepared. A promotion program is planned to create buyer interest in Korean products by publishing periodic letters and brochures.



## Liberia

## FISHING INDUSTRY:

Fish are a primary and favored source of protein in the Liberian diet. Ocean fishing is undertaken by several firms operating about half a dozen trawlers. The most prominent of these is a Liberian firm which began operations in 1953 (with a 55-foot trawler powered by an 80 hp. Diesel engine). At present this firm has two similar-sized fishing vessels in operation under contract, and is planning to acquire at least two additional vessels. It also has ice and cold storage plants in Monrovia.

In addition to organized fishing companies, native fishermen venture forth daily in picturesque canoes in considerable numbers. Most of them are of the Kru tribe who do primarily surface or line fishing, while fishermen of the Fanti tribe, from Ghana, of which there are a number in Liberia, engage primarily in net fishing.

Among the fish and shellfish caught are sole, cassava, butternose, porgy, spiny lobster, crawfish, shrimp, crab, and other edible fish. Fish prices, which,

**Liberia (Contd.):**

for a time, were between \$3.50 to \$5.00 per case of 25 pounds, have recently risen to \$7.50-\$8.50 per case, because of a decline in offshore catches, making it more difficult for the average Liberian to supplement his diet with fish.

**Malaya****JOINT MALAYAN-JAPANESE TUNA FISHING COMPANY SET UP:**

The Malayan Director of Fisheries announced that a Malayan-Japanese tuna fishing company will start operations from Penang in June or July 1959. Ownership of the company will be 51 percent Malayan and 49 percent Japanese, with an initial capital of M\$500,000 (about US\$163,000). Eventually the company will be capitalized at M\$2 million (about US\$654,000). The Japanese will supply technical and administrative staffs.

This project, initiated by the Minister of Agriculture, has been under discussion for over a year and is an indication of the Government's determination to increase the contribution of fisheries to the Malayan economy while, at the same time, improving standards of living among fishermen.

**Mexico****SHRIMP LANDINGS IN 1958 BREAK RECORD:**

Preliminary data of the Mexican Bureau of Fisheries and Allied Industries indicate that the 1958 shrimp catch was a record one. These data show that almost 31,400 metric tons (about 69 million pounds) of shrimp (mostly headless, but including whole, dried, etc.) were landed in Mexican ports during 1958. This was more than 15 percent above the previous record of 26,966 metric tons landed in 1956.

It is estimated that the United States imports of shrimp from Mexico during 1958 were greater than the previous

record of 53.7 million pounds made in 1956. The value of the 1958 Mexican shrimp exports is estimated at about US\$40 million.

The big increase in the Mexican catch came from the west coast which produced about one-third more shrimp in 1958 than in 1957. The Gulf of Mexico catch was about six percent less than in 1957. Preliminary figures place the Pacific catch at 22,100 metric tons and the Gulf of Mexico at 9,300 metric tons.

As anticipated, there was a good run of shrimp on the west coast of Mexico during late summer and fall. The warmer water temperatures produced a crop of shrimp along the Pacific side of Baja California that extended north as far as Sebastian Vizcaino Bay, which was a northerly record for commercial shrimp fishing. The abundant early rains allowed for an excellent crop in the estuaries. The fisheries in the estuaries south of Mazatlan are reported to have had a record year.

During the latter part of 1958 some 100 trawlers transferred from the Carmen-Campeche area in the Gulf of Mexico to Salina Cruz on the Pacific. These boats had a good season. The Pacific coast produced about 4,000 metric tons more shrimp in 1958 than in the previous record year (1955), the United States Embassy in Mexico City reported on February 13, 1959.

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**MERIDA SHRIMP FISHERY TRENDS:**

Shrimp landings at the Gulf of Mexico ports of Campeche and Ciudad del Carmen totaled 4,741,000 pounds during September-December 1958, down slightly from the landings of 4,720,000 pounds during the preceding quarter. Heavy storms in December damaged vessels and equipment in Carmen and Campeche and curtailed the December catches.

Shrimp landings in those ports for the year 1958 totaled 15,969,000 pounds, or about 4 percent less than the 16,630,000 pounds landed in 1957. (United States Consulate dispatch from Merida, dated January 22, 1959.)

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Mexico (Contd.):

#### NEW EAST COAST FISH MEAL PLANT:

A new fish meal plant is scheduled for completion in Ciudad del Carmen, Mexico, about May 1, 1959. The plant, with Danish equipment, will have a capacity of 10 tons of raw fish an hour. The owners of the plant have recently completed negotiations for purchasing two menhaden boats in the United States. This represents a new endeavor for the east coast of Mexico. Plans call for processing anchovies and herring-like fish and scouting for fish by airplane.

If this enterprise proves successful, it is believed that other plants will spring up shortly, as Mexico has a deficit of fish meal. In 1957 over 2,600 metric tons of fish meal were imported, the United States Embassy at Mexico City reported on February 6, 1959.

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#### PROTOCOL TO INTERNATIONAL WHALING CONVENTION APPROVED:

By Decree dated December 26, 1958 (Diario Oficial of February 11, 1959) Mexico approved the Protocol, signed in Washington November 19, 1956, to the International Convention for the Regulation of Whaling of 1946.

Mexico, at present, does not engage in whaling activities. Reports indicate increasing numbers of whales off the west coast of Mexico.



#### **Morocco**

#### FISH-PROCESSING INDUSTRY TRENDS:

The new chronic problem of finding markets for fish (mostly sardines) canned in Morocco was aggravated by the partial collapse of the French market during 1958. During the first eight months of 1958, only 3,505 metric tons were sold in France, compared with 4,870 metric tons during the same period in 1957, an article in the January 9, 1959, *Al Ittihad* points out.

The French market is indispensable for the industry because of the duty-free

quota of 12,000 metric tons. The cost price for a case of canned sardines is 4,000 Moroccan francs (US\$9.50). On the French market, because of the quota, a case of sardines brings 6,000 francs (\$14.30), whereas only 3,400 francs (\$8.10) can be obtained elsewhere. Thus, only the solid base of the French market makes it possible to sell canned fish elsewhere, earning currency much needed by Morocco.

It is expected that the quota will be abolished now that the Common Market (made up of France, West Germany, Italy, Belgium, Luxembourg, and the Netherlands) has been realized, which may mean the complete ruin of the fish-canning industry in Morocco if she does not join the Common Market. About 3 billion francs (\$7.1 million) are now tied up in stocks (800,000 cases), and the market is falling, while the cost price is going up because of higher taxes and wages.

The production of fish meal and oil is one of the few industries in Morocco which is making advances. Eight factories have recently been put into operation with modern equipment. Markets are readily found and exports in 1957 brought in some 684 million francs (\$1.6 million). One factory produces fish meal for human consumption. Production increased during 1958, but figures are not yet available.

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#### SARDINE VESSEL OUTFITTED WITH ELECTRICAL FISHING EQUIPMENT:

A Moroccan sardine vessel (*El Morchid*) has been outfitted with electrical fishing equipment. Electrical fishing consists in general of emitting electrical currents of certain intensities in the water which attract fish and deprive them of all reflexes for about 2 to 3 minutes--the time needed to capture them either by a suction pump or net. The Moroccan vessel *El-Morchid* is equipped with a suction pump and a "canon."

Fish react differently to different electrical currents. Also, according to their size, fish react differently to a constant current. When a weak electrical current is emitted in the water, fish



### Morocco (Contd.):

will react by jerking and shaking and will swim out of the electrical field. In a strong continuous electrical field, fish are attracted to the anode from which the current is emitted and when quite close to the anode, they will succumb completely to the paralyzing effects of the current.

For the capture of the type of fish desired by the Moroccan vessel--mainly sardines--it is necessary only to attract and not paralyze the fish. This technique has been named by the experts as "electro-taxis." The electrocution of fish, known as "electro-narcosis," is useful mainly for the capture of large fish such as sharks or whales.

The principles of electrical attraction or paralysis of fish have permitted much experimental work with various methods such as electrical hooks for tuna fishing, the concentration of fish schools on the surface of the water, "herding" fish by means of electrical nets and barriers, etc.

The suction pump is simply a rubber tube 25 cm. (9.8 inches) in diameter which can be lowered 74 meters or 243 feet (weight per meter--44 pounds) and by means of suction, pick up the fish attracted by an anode located at its end. The electrical impulse attracts fish for 2 to 3 minutes at a time--the time necessary for the fish to be sucked into the tube. The process is repeated each time a school is located.

The "canon" is even more simple. It is powered by compressed air and can shoot an electrode attached to a floating cable for a distance of up to 100 meters (328 feet) into the middle of a surface school of fish. When the electrode hits the water, the vessel's generator starts transmitting an electrical impulse. In less than a second, the fish are gathered around the electrode within a radius of 10 meters (33 feet). The vessel then approaches the fish and hauls them in by means of a net or the suction tube. This method is used for sardines, pilchards, and other fish up to the size of anchovies.

This gives a general idea of the equipment to be used by the El-Morchid for several months of experimental fishing, using the port of Safi as base. The vessel also has equipment for producing a spray of water. This consists of a powerful shower-like apparatus on a large scale which can pump and spray sea water. Sardines are attracted to water spray and come up to the surface.

The El-Morchid will operate in collaboration with Morocco's Scientific Fisheries Institute which will keep the vessel informed of water temperatures, salinity, plankton distribution, etc. The vessel will also experiment with tuna fishing by means of nets equipped with electrodes. (La Vigie Marocaine, September 20, 1958.)



### Netherlands

#### ANNUAL WHALING REPORT FOR 1957/58:

The management of the only whaling company in the Netherlands in its annual report for the fiscal year July 1, 1957, to June 30, 1958, reports that a six percent dividend was paid as compared to five percent for the preceding fiscal year. In order to enable the company to pay this dividend the Government had to contribute fl. 3,680,073 (about US\$968,000) in accordance with the guarantee agreement concluded in November 1951. During the preceding year the Government paid 4.1 million guilders (US\$1,078,000) to the whaling company. Since 1951 the whaling industry has cost the Government 32.5 million guilders (close to US\$8,548,000). The guarantee agreement provides that the Government guarantee the operating costs and the payment of a certain dividend for a period of ten years. The agreement terminates on June 30, 1961.

Production of whale products by the Netherlands' whaling company's Antarctic expedition was 21,781 metric tons in the 1957/58 season, 21.4 percent more than the 17,945 tons produced during the 1956/57 season.



## Netherlands (Contd.):

The whale oil production in the 1957/58 season was sold at an average price of fl. 814.22 (US\$214.14) a metric ton. In addition the carry-over of the 1956/57 season was also sold. The average price of whale oil production for the 1956/57 season ultimately amounted to fl. 826.36 (US\$217.33) a ton, the United States Consul in Amsterdam reported on January 29, 1959.

Table 1 - Production by the Netherlands Antarctic Whale Factoryship, William Barendsz, 1956/57 and 1957/58

Product	Season	
	1956/57	1957/58
	..(Metric Tons)..	
Whale oil . . . . .	14,678.0	17,295.0
Sperm oil . . . . .	1,103.0	2,126.0
Meal . . . . .	2,111.0	2,302.0
Vitamin oil . . . . .	12.9	15.0
Whale bones . . . . .	40.0	43.0
Sperm whale teeth . . . . .	0.2	0.3
Total . . . . .	17,945.1	21,781.3

The other products mentioned above were all sold, the sperm oil yielding an average of fl. 769.22 (US\$202.30) a ton and the fish meal an average of fl. 519.94 (US\$136.74) a ton. The entire proceeds of the 1957/58 catch amounted to fl. 17,050,957.02 (US\$4,484,402).

During the 1958/59 season the International Whaling Commission had established the total catch at 14,500 blue-whale units, but the Netherlands Government protested against this number. With regard to future operations, the management reports that as a result of the Netherlands protest the whaling expeditions in the Antarctic may catch 15,000 blue-whale units.

On January 2, 1959, the Netherlands withdrew conditionally from the International Whaling Convention. The Ministry of Agriculture, Fisheries, and Food announced that before making its conditional withdrawal definite, the Netherlands Government wished to do everything it could to contribute towards a solution of current problems. The conditional withdrawal will become effective on June 30, 1959, unless agreement is reached before that date on the so-

called allocation of the maximum quota of whales caught every season. For several years the Netherlands has urged a raising of the catch limit of whale units because, in the opinion of Dutch biologists, the number of whales in the Antarctic is much higher than is generally supposed.

The prices for the various whale products have been showing a downward trend, but the catch of the current Netherlands whaling expedition has already been sold in advance.

Note: Values converted at rate of US\$0.263 = one guilder.



## Norway

## WINTER HERRING FISHERY:

Some 2,500 fishing vessels, mainly drift-netters and purse-seiners, with about 30,000 men, were impatiently waiting early in January in ports along the Norwegian west coast for the annual influx of herring. At the same time, herring meal and oil reduction plants were geared for day-and-night operation during the hectic fisheries. As of mid-January, however, no substantial herring shoals had been spotted by any of the five ocean research vessels operated by the Norwegian Fishery Directorate's Oceanographic Institute in Bergen.

The herring search, which is more extensive than ever before, started January 5. Participating are four of the Oceanographic Institute's own vessels, and one chartered craft. Through cooperation with Norwegian Navy and Air Force planes, they expected to cover all waters in the Norwegian Sea where the herring are likely to appear. Investigations were initially concentrated on mapping salinity and temperature distribution. But as soon as the herring were contacted, researchers expected to promptly flash short-wave reports to the fishermen through coastal radio stations.

Much is at stake in the impending herring fisheries. A big catch would go a long way to make up for last year's dismal results, which followed the poor season in 1957. Only about 240,000 metric tons of fat herring were landed in 1958, as against nearly 700,000 tons the previous year. The over-all catch of winter and spring herring dropped from 880,000 tons in 1957 to a total of only 415,000 tons in 1958. To enable fishermen to gear for the new season, the government was obliged to extend low-interest equipment loans and direct aid to hardship cases. Meantime, seasonal unemployment had reached the highest figure in quite a few years.

At best, the winter herring fisheries in Norway are a gamble, with the outcome in large measure depending on the mercy of the elements. Though the sea may be teeming with the silvery fish, operators can readily be ruined by stormy weather. The catch has got to be larger than ever to cover the high cost of operating fishing vessels.

A statistical study made by the Norwegian Fishery Directorate reveals that the cost of operating a purse-seiner rose 81 percent between 1950 and 1958. In the same period, gear and other equipment costs went up 131 percent. The over-all cost increase was thus 97 percent. On this basis, it is estimated, each of the 500 odd purse-seiners slated to participate in the western herring fisheries this year will have to catch nearly 1,200 metric tons before breaking even. For the purse-seining fleet as a whole, there can be no question of making a profit unless the catch exceeds 600,000 tons.

Nevertheless, the stress on well-equipped fishing vessels and new gear to meet competition is as strong as ever.

## Norway (Contd.):

Thus, more fishermen go in for efficient nylon seines, costing as much as Kr. 120,000 (US\$16,800) each. Though only 11 were used in last year's herring fisheries, as many as 50 will probably be used this season. And after the successful tests made with nylon drift nets in last summer's Iceland herring fisheries some of the drift-netters also are expected to switch from cotton to nylon. (*News of Norway*, January 15, 1959.)

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WINTER HERRING  
SCHOOLS ARRIVE LATE:

The winter herring schools arrived off the coast of Norway about January 24, a little more than a week later than the normal time of appearance. As a rule, the herring remain just off the west coast of Norway for about one month. The date of arrival of the herring is important to the fishermen as it determines the number of days before February 15 when the fish command a higher price because after that date the ex-vessel price drops due to the lower fat content of the fish after spawning.

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WINTER HERRING FISHERIES  
HAMPERED BY STORMS:

Violent gales raged all along the coast of west and north Norway in mid-February, without signs of a letup, causing loss of life and extensive property damage at sea and on shore. For days on end, bad weather forced fishing vessels to stay in port, thus reducing herring and cod landings to a trickle, with huge losses for fishermen, processing plants, and businessmen. And each day of idleness spelled less foreign exchange earnings from the export of fishery products, which in a good year may total nearly one billion kroner (US\$140 million).

The first phase of the winter herring fisheries, centering on the fat sloe herring, came to an end February 21. The result was rather poor, and hardly any landings were made the last part of February. The total catch was slightly over 321,000 metric tons, with a first-hand value of some Kr. 87.5 million (\$12.3 million). Only two postwar years, 1946 and 1958, produced smaller yields. Last year the sloe herring catch totaled less than 227,000 tons, the lowest in many years. With the start of the spring herring season,

February 23, the price of raw herring dropped about 10 percent because of lower fat content.

According to the Fisheries Minister, the 1958 herring catch, including both sloe and spring herring, will have to total at least about 730,000 tons to earn a profit. Last year's over-all total of only about 330,000 tons brought hardships to fishermen and all others concerned. This year's yield will be better than that, though it is not likely to reach anywhere near the minimum suggested by the Minister.

When the supply of herring and cod is meager or irregular, herring oil and meal processing plants get no or little raw material, and fish filleting and freezing plants are unable to fill their contracts. And the unemployment caused by empty nets and seines spreads to other industries. (United States Embassy dispatch from Oslo, February 20, 1959.)

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DOLLAR IMPORT  
LIBERALIZATION INCLUDES  
CERTAIN FISHERY PRODUCTS:

All items on the Norwegian list of free imports from countries participating in the Organization for European Economic Cooperation, effective January 1, 1959, may also be imported from the dollar area free from quantitative restrictions and without import licenses. This measure ends the discrimination against dollar countries which had resulted from a significant difference between Norway's dollar and OEEC import liberalization lists. The move is related to the introduction of external convertibility whereby the Norwegian currency, together with those of the United Kingdom and of various other Western European countries, may be freely converted into dollars for payments of imports.

The new Norwegian import regulations comprise only one list of items which will remain subject to import licensing requirements from all sources. However, the previous regulations show that a considerable number of goods were liberalized when imported from OEEC countries but not from dollar countries. According to a report, these are the goods which are newly liberalized when imported into

## Norway (Contd.):

Norway from countries in the dollar area. Among them, the following appear to be of interest to United States fishery products exporters: canned salmon, canned lobsters, and various other fish and fish products. (Canada's Foreign Trade, January 31, 1959.)



## Pakistan

### JAPANESE CONTINUE TO SHOW INTEREST IN DEVELOPMENT OF EAST PAKISTAN FISHERIES:

During December 1958, a Japanese fishing vessel, the *Chosui Maru* on the invitation of the Government of Pakistan called at Chittagong. While in the Bay of Bengal, the vessel undertook a limited amount of exploration of the fishery resources of the Bay area. At the same time, according to local press accounts, two Japanese fishing experts and members of the International Fishery Cooperative Association called on the East Pakistan Director of Fisheries to discuss exploitation of the Province's fish resources. Press reports indicated that the experts planned to submit a report on their findings to the Government of East Pakistan.



## Panama

### SHRIMP FISHERY TRENDS, 1958:

Panama's shrimp industry, with an estimated investment of US\$8.5 million, experienced the worst slump in 1958 of any of Panama's major industries. Expansion of plant facilities and fleet in 1956-57 absorbed profits of the lush years and the industry entered 1958 with little capital reserves. Absence of the pink shrimp stocks in 1958 cut sharply into anticipated earnings early in the year. The extended drought of 1957 apparently affected production of the large white shrimp. The plentiful supply of the small shrimp ("titi") kept the industry alive but profits were cut by higher processing costs on a lower-valued product.

The break in the United States "titi" market forced boats to new fishing grounds. About 20 of Panama's shrimp trawlers fished Nicaraguan waters during the fourth quarter of 1958. Catches of white shrimp, slightly smaller than the Panamanian variety (average 26-30 count), and Mexican brown shrimp (average 31-35), were sent back by boat to Panama for processing. In January 1959 high winds had forced all vessels to cease operations for the dry season, but a number probably will return in May. Nicaragua does not permit trawling in lagoons which are shrimp-breeding grounds, and coastal waters off the lagoons have yielded good catches. Other boats are known to have fished in Colombian and Honduran waters.

Official statistics for nine months 1958 report the quantity of frozen shrimp exports at 26 percent above the 1957 level, but the value of US\$832,000 is 17 percent less than for the comparable period of 1957. Estimates made on the basis of manifests indicated shipments during 1958 were slightly above 1957 in quantity, but include an unknown amount of large whites frozen separately and packed 25 pounds to the 50-pound carton. Moreover, as all shrimp, regardless of origin, are exported as Panamanian shrimp, it is difficult to estimate the real decline in the catch in Panama's waters. The industry is hopeful of a good pink season in 1959 as an increasing number was being caught in deep water early in the year, the United States Embassy in Panama reported on January 29, 1959.

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### LAWS AND REGULATIONS AFFECTING SHRIMP FISHERY:

Summaries of the laws and regulations affecting the fishery for shrimp, compiled by the United States Embassy in Panama, are as follows:

#### Decree No. 172 of August 5, 1953:

This regulation requires all companies and individuals to obtain a commercial license, second class, in order to engage in commercial fishing within the waters over the Continental Shelf. (The 1946 Constitution requires 5 years' residence

## Panama (Contd.):

for all non-Panamanians with the exception of United States citizens residing in the Republic, in order to obtain a commercial license.) Also provides that only boats constructed in the Republic of Panama shall be permitted to engage in commercial fishing except those foreign-built boats fishing as of the date of the decree.

Decree-Law No. 12 of May 10, 1950: Shrimp packing companies were organized and have operated under this Decree Law which grants for a period of up to 25 years certain privileges and concessions.

By agreement between the Government and the shrimp packing companies in the fall of 1957, these Panamanian companies gave up their concession for exemption from income taxes on earnings accruing from sales abroad. The agreement provides that all shrimp companies shall pay income tax on 50 percent of earnings, including those accruing from sales made outside the Republic. This tax is payable quarterly.

Law 25 of February 5, 1957: This law supercedes Decree-Law No. 12 with the major change being the reduction of the period of special privileges from 25 to 15 years. However, newly-organized companies are given the time remaining on the contract of the first company organized in the specific field of activity. The most recently-organized shrimp freezing company by Contract No. 43 of February 7, 1958, was granted the privileges and concessions of Law 25 for a period of 18 years.

Law 58 of December 18, 1958: This law extends the territorial waters of the Republic of Panama to a width of 12 nautical miles, including the sea bed and submarine sea floor covered by this area and the airspace above it. Its main impact will be on bait fishing of anchovetta by United States tuna boats but it could affect shrimp fishing, particularly if current experimental deep trawling for pink shrimp proves productive.

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# PROTOCOL TO INTERNATIONAL WHALING CONVENTION APPROVED:

Panama's National Assembly by Law 37 of October 25, 1958, approved the Protocol of the International Convention for Regulation of Whale Fishing which was drawn in Washington, D. C., December 2, 1946. The Instrument of Ratification was due to be signed by the President and forwarded to London for deposit about January 20, 1959.



## Peru

## EXPORTS OF MARINE PRODUCTS, JANUARY-SEPTEMBER 1958 AND 1957:

Exports of marine products by Peru January-September 1958 increased 34.7 percent (27,181 metric tons) in quantity, but declined 3.7 percent (US\$552,000) in value as compared with January-September 1957. Sharp increases occurred in industrial fishery products due to the expansion of processing facilities for whales and fish reduction. However, exports of edible fishery products (mostly canned bonito and frozen tuna) were down 27 percent and guano down 73 percent in the first nine months of 1958 as compared with the same period in 1957. In 1958 Peru's landings of bonito and tuna were lower and the world market for tuna and bonito (both canned and frozen) was not as firm as the previous year.

Peruvian export prices for fish meal vary according to the protein content. Fish meal made from whole fish has a high protein content of some 65 percent and is sold at a substantially higher price than fish meal from fish waste which contains about 52-53 percent protein. It is reported that the January 1959 f.o.b. Peruvian port export price for fish meal of high protein content was about US\$137-138 a metric ton (somewhat lower than the previous few weeks and the price of US\$145 in September last year), while the export price for low-protein fish meal was around US\$100 to US\$105 a ton, also on an f.o.b. Peruvian port basis. (United States Embassy, February 4, 1959.)

Peru's Exports of Principal Marine Products, January-September 1957-1958

Product	Jan.-Sept. 1958			Jan.-Sept. 1957		
	Quantity		Value 1/	Quantity		Value 2/
	Metric Tons	Million Soles	US\$ 1,000	Metric Tons	Million Soles	US\$ 1,000
Fish meal . .	76,716	188.2	8,262	38,396	85.8	4,516
Fish, frozen & canned . .	18,223	112.5	4,939	24,959	168.2	8,853
Sperm oil . .	5,888	19.8	869	2,867	10.4	547
Fertilizer (guano) . . .	1,952	3.5	154	7,138	9.8	516
Fish oil . . .	1,497	4.0	176	4,030	10.6	558
Whale meal . .	1,295	2.9	127	1,000	1.7	89
Total . . .	105,571	330.9	14,527	78,390	286.5	15,079

1/ F.o.b. values converted at rate 22.78 soles equal US\$1.

2/ F.o.b. values converted at rate 19.00 soles equal US\$1.

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## FISHERIES TRENDS, FOURTH QUARTER 1958:

Conditions were generally satisfactory for the Peruvian fishery industry



## Peru (Contd.):

during the fourth quarter of 1958. So many boats were engaged in catching anchoveta to satisfy the needs of the profitable fish-meal industry that canneries were occasionally unable to purchase sufficient supplies of bonito. There was an abundance of tuna for purse seiners and shipments of frozen tuna increased during the fourth quarter.

Fish-meal producers stated that fourth quarter prices varied from \$130 to \$152 a metric ton according to protein content. Total exports for 1958 are estimated at 115,000 tons. Although the fishing industry claims that its catch of anchoveta is insignificant as compared to the consumption by the guano birds, agricultural interests and the Guano Corporation persuaded the Government to further restrict anchoveta fishing in bird-feeding areas.

Table 1 - Peruvian Exports of Principal Marine Products, January-September 1957-58

Product	Jan.-Sept.	
	1958	1957
	.. (Metric Tons) ..	
Canned bonito. . . . .	8,941	14,147
Fish meal. . . . .	76,716	38,396
Frozen tuna. . . . .	5,327	5,111
Frozen skipjack. . . . .	2,839	4,036
Sperm oil. . . . .	5,888	2,867
Total. . . . .	99,711	64,557

The National Society of Fisheries moved during the fourth quarter to bring a measure of organization to the marketing of Peruvian canned bonito. Peru's tight credit restrictions had caused individual cannery to offer canned bonito at cut-rate prices, resulting in damaging competition among Peruvian canners. Approval by the National Society of Fisheries is required for all export licenses, and the Society has established a floor price for all bonito sales abroad.

During the first nine months of 1958 exports of the principal marine products increased sharply to 99,711 metric tons from the 64,557 tons exported in the same period of 1957. During January-September 1958, exports of fish-meal (76,716 tons) were about double the

38,396 tons exported in the same period of 1957. During the same period of 1958 exports of canned bonito (8,941 tons) declined about 32.8 percent.



## Philippines

## CANNED SARDINE SURPLUS:

A factional split in the Philippine National Marketing Corporation's board of directors during the last half of 1958 over whether to purchase higher-priced United States sardines or lower-priced Japanese brands, has resulted in a serious overstock of canned sardines.

After considerable discussion the board agreed to import 313,499 cases of Japanese sardines late in 1958. Orders were placed so late and customer response has been so cold that a large proportion of these sardines still remains in the corporation's warehouses. The general manager now fears that if the 500,000 cases authorized for importation during the first half of 1959 are imported, a serious surplus will result and many cases will spoil. He believes that this would result in an excess of 61,614 cases over the monthly requirement of 81,000 cases for each of the first six months of 1959. The manager attempted to delay or halt placement of orders for additional sardines, but a "faction" in the board of directors was insisting that orders for the 500,000 cases be placed.



## Poland

## FISHERY LANDINGS, 1958:

Landings of marine fish and shellfish amounted to 124,145 metric tons in 1958, according to a report by The Polish Press Agency of January 24, 1959. Landings included 56,740 tons of herring, 36,410 tons of cod, 14,815 tons of Baltic herring, 11,647 tons of sprat, 877 tons of mackerel, 409 tons of eels, 159 tons of salmon, and 307 tons of other fish: The 1958 landings were close to 87 percent of the goal set by the five-year plan, the United States Embassy in Warsaw reported on January 30, 1959.





## Portugal

### SARDINE LANDINGS IN 1958 BREAK RECORD:

The Portuguese sardine fishing fleet landed a record catch of 139,360 metric tons of sardines during 1958, an increase of 27.4 percent over 1957. The fleet also landed 12,610 tons of anchovy, an increase of 60 percent over 1957. The total 1958 catch by this fleet amounted to 202,729 tons as compared to 191,724 tons in 1957, an increase of 5.7 percent.

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### FISHERIES TRENDS, OCTOBER 1958:

Sardine Fishing: During October 1958, the Portuguese fishing fleet landed 26,270 metric tons of sardines (valued at US\$1,823,930 ex-vessel or \$69 a ton). In October 1957, a total of 25,300 tons of sardines was landed (valued at US\$2,048,382).

Canneries purchased 58.6 percent or 15,394 tons of the sardines (valued at US\$1,179,687 ex-vessel or \$76.63 a ton) during October. Only 212 tons were salted, and the balance of 10,664 tons was purchased for the fresh fish market.

Other Fishing: The October 1958 landings of fish other than sardines were principally 4,971 tons (value US\$311,791) of mackerel, 3,231 tons (value US\$149,322) of chinchards, 2,661 tons of anchovies (value US\$71,965), 381 tons of tuna (value US\$62,991), and 141 tons of bonito (value US\$20,696). (Conservas de Peixe, December 1958.)

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### CANNED FISH EXPORTS, JANUARY-OCTOBER 1958:

Portugal's exports of canned fish during January-October 1958 amounted to 53,725 metric tons (1,277,400 cases), valued at US\$28.6 million as compared with 41,674 tons, valued at \$25.3 million, for the same period in 1957. Sardines in olive oil exported during the first ten months of 1958 amounted to 37,446 tons, valued at \$19.8 million.

During January-October 1958, the leading canned fish buyer was Italy with

9,261 tons (valued at \$4.8 million), followed by Germany with 8,518 tons (valued at \$4.6 million), Great Britain with

Portuguese Canned Fish Exports, January-October 1958			
Product	1958		
	Jan.-Oct.		
	Metric Tons		US\$ 1,000
Sardines in olive oil . . . . .	37,446		19,779
Sardinelike fish in olive oil . . .	5,348		3,595
Sardine & sardinelike fish in brine	950		221
Tuna & tunalike fish in olive oil .	1,988		1,506
Tuna & tunalike fish in brine . . .	858		442
Mackerel in olive oil . . . . .	6,231		2,769
Other fish . . . . .	904		282
Total . . . . .	53,725		28,594

6,424 tons (valued at \$3.3 million), the United States with 5,097 tons (valued at \$3.6 million), and Belgium-Luxembourg with 3,859 tons (valued at \$2.0 million). Exports to the United States included 2,109 tons of anchovies. (Conservas de Peixe, December 1958.)

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### CANNED FISH PACK, JANUARY-AUGUST 1958:

The total pack of canned fish for January-August 1958 amounted to 26,336 metric tons as compared with 29,039 tons

Portuguese Canned Fish Pack, January-August 1958		
Product	Net Weight	Canner's Value
	Metric Tons	US\$ 1,000
In Olive Oil:		
Sardines . . . . .	14,468	8,261
Sardinelike fish . . . . .	3,631	1,691
Anchovy fillets . . . . .	2,166	1,834
Tuna . . . . .	1,500	1,129
Other species (incl. shellfish) . .	320	219
In Brine:		
Sardinelike fish . . . . .	3,768	685
Other species . . . . .	483	155
Total . . . . .	26,336	13,974
Note: Values converted at rate of 28.75 escudos equals US\$1.		

for the same period in 1957. Canned sardines in oil (14,468 tons) accounted for 54.9 percent of the January-August 1958 total pack, higher by 33.9 percent than the pack of 10,808 tons for the same period of 1957, the December 1958 Conservas de Peixe reports.



## Singapore

### JAPANESE TO TRAIN LOCAL FISHERMEN:

The Japanese have agreed to a request by the Singapore Government to train some local fishermen in the techniques of pair-trawl fishing. These men will be trained in Japan through the agency of the Colombo Plan to aid in the development of Ceylon's offshore fishing. Three companies have already been licensed to engage in pair-trawl fishing.

The technical assistance to Singapore's fishermen through the Colombo Plan is in addition to the assistance already being extended by one of Japan's largest fishing concerns. It is understood that the new fishermen's training program will involve teachers from one of Japan's principal training schools, the United States Consul in Singapore reported on February 13, 1959.



## Spain

### VIGO FISHERIES TRENDS, DECEMBER 1958:

Fish Exchange: Landings of fish and shellfish in December 1958 at the Vigo Fish Exchange amounted to 4,363 metric tons, a drop of 4,652 tons from the preceding month, and 262 tons below the landings for December 1957. Major species sold over the exchange in December 1958 were: anchovies, 882 tons; sardines, 765 tons; horse mackerel, 641 tons; and small hake, 633 tons.

The December 1958 landings were valued at US\$1,192,000 (US\$1.00=42 pesetas), only \$373,000 less than November and close to \$230,000 above the value for December 1957.

Landings at the Exchange for the last quarter of 1958 amounted to 22,827 tons (value US\$4,171,000), an increase of 5,046 tons over the third quarter, and an increase of 3,345 tons over the same quarter of 1957.

Unique for the fourth quarter was the greatly increased landings of anchovies which normally make their appearance

in late winter. Needlefish landings were at the same level as last year, marking the second year in a row that this species has failed to appear in its usual abundance. Sardine catches were disappointing, 94 tons below the landings in the last quarter of 1957.

Total fish and shellfish landings at the Exchange for 1958 were 64,253 tons, an increase of 184 tons over 1957. The value of the 1958 landings was US\$14,451,000, higher by \$2,296,821 than the value for 1957.

Fish Canning and Processing: Cannery in the Vigo area purchased 5,259 tons of fish and shellfish on the Exchange during October-December 1958, a drop of 435 tons from the third quarter of 1958, but 2,232 tons more than the purchase in the fourth quarter of 1957. The smoking, drying, and pickling processors purchased 3,566 tons, about 1,801 tons above the third quarter of 1958, and 271 tons above the same quarter in 1957.

In 1958 local cannery purchased a mere 652 tons more than in 1957 from the Vigo Fish Exchange. Purchases by processors other than cannery during the year from the exchange were 2,257 tons less than they were in 1957.

Tin Plate: The good canned fish pack in 1958 resulted in the depletion of tin plate reserves held by cannery. Additionally, the government has informed cannery that no foreign exchange is available for importations of tin plate in 1959. As a result, cannery throughout Spain have petitioned for US\$1 million of United States foreign aid funds for the purchase of 50,000 double boxes of tin plate (112 sheets, approximately 220 pounds)--10,000 boxes for fish cannery, and the rest for other food industries.

The Vigo fish cannery appear to be overly optimistic over the granting of the aid, their only worry being that the tin plate won't arrive until after May or June when seasonal activity starts. Reserves of tin plate are estimated at 16,000 metric tons and annual consumption at about 35,000 tons.

For those fish cannery holding foreign exchange reserves in the three special

## Spain (Contd.):

export programs, the so-called "CP" areas, the Government is considering another program of temporary admissions which exempts the tin plate from customs costs, etc., if reexported within a defined period of time. How the new 25 percent import levy ("fondo de retorno") will influence the contemplated temporary admissions program is unknown.

**Fish Prices:** The last of the price restrictions on fresh fish prices were removed in October 1958 when the Office of Supply and Transportation removed retail price ceilings on hake and small hake. This follows the pattern set in July when price ceilings were also removed on the large and medium sizes of dried cod, except for imported cod. (United States Consulate, Vigo, dispatch, January 28, 1959.)

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#### FOOD CANNERS AGREE ON STANDARD-SIZE CANS:

Attending the October 5-9, 1958, conference in Brussels of the Permanent International Committee on Food Canning were the Secretary of the National Fisheries Syndicate and the President of the Galicia Canners Union.

The Committee, representing 14 nations and the United Nations, concerned itself with the standardization of containers for fish, meat, and vegetable products, and practical methods for determining the net weights to be adapted to each type. Seventeen sizes of cans were selected for use in export trade and were submitted to the International Standards Organization in London.

The Spanish fisheries industry again showed its preoccupation with possible competition from frozen sardines, insisting that this product be so identified on labeling. Moroccan interests, according to some industry members, are hoping in the future to ship frozen sardines to France for canning and sale in the Common Market. (United States Consulate, Vigo, dispatch, January 28, 1959.)

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#### TERRITORIAL WATERS:

Attending the November 1958 conference in Paris of the Fisheries Federations of Western Europe was the head of the Spanish Syndical Federation of Shipowners and prominent Vigo fisheries industrialist. Assisting at the conference were representatives from France, Portugal, Spain, Holland, Belgium, Germany, Denmark, Sweden, and Norway.

The delegates unanimously agreed to present to their respective governments the following matters:

(1) To organize with the greatest rapidity possible an international conference to define the limits and conditions influencing international fishing, particularly where the 1958 Geneva Conference reached no agreement.

(2) To oppose any unilateral decision affecting the extension of territorial waters before the proposed conference terminates its work.

(3) To take into account in any proposals submitted to this conference, the traditional rights of countries in various fisheries areas, and to defend them as amply as possible. (United States Consulate, Vigo, dispatch, January 28, 1959.)

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#### FISHERIES LABOR PROBLEMS

The Ministry of Labor is studying the possibility of new labor regulations exclusively for the cod-fishing industry, presently covered under the "Maritime Fishing and Factories" regulations.

The cod-fishing industry consists now of 4 large companies, an estimated 4,500 crewmen, 30 cod vessels (9 more are under construction which will raise the tonnage of these specialized ships to 53,000 metric tons), and 70 smaller "parejas" displacing over 50,000 tons (20 more are under construction). Yearly catch is estimated at 50,000-60,000 metric tons of dressed fish, approximately 7-8 percent of the total Spanish fisheries landings. Because of the large increase in cod activity (catches are double those for 1948), the construction of large (over 1,000 tons) cod vessels requiring merchant marine officers in

## Spain (Contd.):

charge, and the new factories for drying and processing, the present regulations are considered obsolete.

The plurality of conditions which face the short-range fishing fleet as a result of different port practices based on long tradition and convenience, makes it impossible to encompass the whole short-range fishing fleet in one collective agreement, according to the National Fisheries Syndicate.

As a result of this, the syndicate has decided that the best solution is collective pacts between the different productive elements of the fleet. These new agreements, according to the syndicate, must incorporate the minimum benefits now present in the national "Regulations for Workers." Where these national labor guarantees are not applicable because of the unique working conditions of some coastal fishermen, the syndicate has obtained permission from the Ministry of Labor for a preliminary project termed the "Regulations for Maritime Workers" which contains improvements in labor conditions such as family bonus, vacations, overtime, minimum work day, and seniority, to cite the most important.

To formulate this new policy the syndicate has authorized the initiation of the first pact between the 75 shipowners and 906 crewmen of the Fishermen's Association of Laredo, Santander, which the syndicate hopes will be the starting point for pacts which will cover the local problems of every "cofradia" on the littoral.

Preliminary points agreed to in this first collective pact with coastal fishermen are:

(1) Splitting profits derived from fish catches 50-50 between shipowners and crewmen.

(2) The quantity of fish and money bonus to be given to each man based on the size of the fish catch.

(3) Splitting costs 50-50 between owners and crew except that communications facilities and navigating instruments

will be the responsibility of the ship-owners.

(4) Value of salvageable material (shack) found at sea will be split two-thirds for the crew, one-third for the owners. (United States Consulate, Vigo, dispatch, January 28, 1959.)



## Sweden

SEA FISHERY LABORATORY  
RESEARCH PROGRAM FOR 1959:

The 1959 program of the Swedish Sea Fishery Laboratory at Lysekil includes a project whereby an analysis will be made of the sexual maturity of herring. Samples will also be taken in order to determine the composition of the herring stock as respects length, weight, sex, age, and racial data.

Trawling expeditions will leave at different times of the year bound for the North Sea, the Skagerrak, and the Kattegat where data will be collected regarding the size, races, and composition of the whiting stock; special attention will be paid to the different whiting species. In conjunction with the whiting research, efforts will also be made to determine the distribution and composition of the stock of Norway lobster in the Skagerrak.

Research as respects sprat will be postponed for the time being, it is stated, because of personnel shortage at the Sea Fishery Laboratory. The research vessel *Skagerack* will, however, participate in the common surveys being planned in Sweden, Norway, and Denmark covering the drifting of young sprat and sprat roe in the Skagerrak and the Kattegat.

The *Skagerack* will also depart in May on a three weeks' expedition to the new fishing grounds at Rockall, where research will be conducted on ling, the United States Consul at Goteborg reported on January 22, 1959.





## Taiwan (Formosa)

### FISHERIES LANDINGS IN 1958:

The 1958 fishery landings in Taiwan reached 229,677 metric tons. This broke the record of 208,121 tons set in 1957 and exceeded the target set in the Second Four-Year Production Plan by 9,677 tons. The catch by categories as compared with the 1957 catch is shown in the table.

Taiwan's Fishery Landings, 1957-58		
Type of Fishery	1958	1957
	. (Metric Tons).	
Deep-sea . . . . .	61,160	52,223
Inshore . . . . .	81,720	71,552
Coastal . . . . .	38,267	38,468
Fish culture . . . . .	48,530	45,878
Total . . . . .	229,677	208,121

The greatest increase was from deep-sea fisheries, accounted for by the increase of offshore tuna vessels and bull-trawling vessels. The increase in catch from inshore fishing was due to larger boats and new motors and the heavy runs of moonfish (*Mene maculata*) and sea bream. The catch from coastal fishing decreased slightly due to the poor run of mullet and the stiff competition from powered boats. The increase from fish culture was due to an abundant supply of milkfish fry and the use of more reservoir ponds for raising fish.

### WHALING IN 1958:

The 1958 whaling operation with Japanese cooperation was more successful than the previous year. A Japanese whaler of 270 tons, *Kyomaru No. 3*, was dispatched to Banana Bay off southern Taiwan for three months' hunting from January to April. A total of 12 humpbacks were caught as against only 4 in 1957.

### FROZEN TUNA EXPORTS:

The four 350-ton tuna long-liners caught enough fish in their trips to the Indian Ocean to warrant some small exports of frozen tuna to the United States. A total of 146 tons of frozen tuna (mostly yellowfin) were exported in 1958.

### PESTICIDES USED IN MILKFISH PONDS:

The use of Diazinon or BHC for controlling Chironomid larvae was developed

by the Tainan Fish Culture Station. Chironomid larvae have been found to be the chief undesirable organism in milkfish ponds, because they compete with the milkfish for natural food (bottom algae) as well as destroy the algae bed on the pond bottom. The use of BHC and Diazinon has become now quite popular with the milkfish farmers in Taiwan.

--By T. P. Chen, Senior Fisheries Specialist,  
Joint Commission on Rural Reconstruction,  
Taipei, Taiwan

Note: Also see Commercial Fisheries Review, April 1958 p. 74.



## Union of South Africa

### SPINY LOBSTER CATCHES GOOD OFF CAPE PENINSULA:

Exceptionally large quantities of spiny lobster appeared suddenly in the Cape Peninsula area of South Africa early in February 1959 and since then the fishermen have been making some of the biggest catches ever recorded in that area. It is estimated that as many as 30,000 spiny lobsters were taken in a single day since the run began. Another feature of the catch was that the lobsters were reported by fishermen to be uniformly large in size and slightly different in appearance from those usually landed. Rather than the dark, almost black appearance, the spiny lobsters were described as having a dark back with yellow legs and patches of yellow on the sides.

This is a welcome bonanza to spiny lobster fishermen who experienced poor catches, particularly in the Cape Peninsula area, in 1958. The total spiny lobster catch from the Union of South Africa waters in 1958 was estimated by the Division of Fisheries to have been slightly over 8,000 short tons as compared with 14,000 tons in 1957. Exports of frozen spiny lobster tails (mainly to the United States) totaled 4.5 million pounds in the first ten months of 1958 as compared with 6.0 million pounds in the same period of 1957.

There have thus far been no reports that spiny lobster fishing areas other



## Union of South Africa (Contd.):

than the Cape Peninsula region have experienced any sudden increase in catches, reported on February 12, 1959.



## U. S. S. R.

NEW SEVEN-YEAR  
PLAN FOR FISHERIES:

In the new seven-year plan for the Soviet Union's economy for the period from 1959 to 1965, it is stated that the catch of fish shall be increased by 62 percent from 2.85 million metric tons in 1958 to 4.6 million tons in 1965. The increase will be achieved, in part, by bringing into use new fishing areas in the open ocean.

The catches in recent years have been as follows: 2.3 million metric tons in 1954, 2.5 million tons in 1955, 2.6 million tons in 1956, and 2.85 million tons in 1958.

The increase during the 1954/58 period has averaged about 135,000 tons a year, but the planned increase in the coming seven-year period is about 250,000 tons yearly. This is a significant reduction in comparison to the sixth five-year plan which expected to increase the catch about 340,000 tons annually from 1955 to 1960 and bring it up to 4.2 million tons in 1960.

The published part of the plan does not say anything about expanding the construction of the fisheries fleet, but according to reports in the press it is to be increased by 70 percent.

According to an article in Poljarnaja Pravda on November 12, 1958, the Murmansk area will increase its catch from 570,000 tons in 1957 to 840,000 tons in 1965. This is an increase of only 47 percent, and the Murmansk area's share of the total catch will, therefore, drop from 20 percent in 1957 to 18 percent in 1965. The Eastern Sea area's share of the total catch will increase inasmuch as Estonia will increase its catch by 130 percent, Latvia by 120 percent, and Lithu-

ania by 70 percent. In an article in Pravda for November 26, 1958, it is stated that Estonia will increase its catch of herring in the North Atlantic 4.8 times, and that the number of trawlers and auxiliary craft in Estonia's fleet will be increased greatly with this in view. In addition, in 1959 it is planned to begin building a harbor for the fishing fleet in Tallinn (Fiskets Gang, January 1, 1959).

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## FISHERY RESEARCH FACILITIES:

Russia claims to have about 100 fishery research vessels in all, although many of these are converted trawlers and vessels engaged in purely oceanographic work; they also have 25 fishing research organizations all over the Soviet Union. This was the reply of the leader of the Soviet delegation at the Dublin meeting of the Permanent Commission of the International Convention on Overfishing when asked about Russia's fishery research. (World Fishing, January 1959.)



## United Kingdom

## FISHERY LOANS

## INTEREST RATES INCREASED:

The British White Fish Authority announced that, as a result of a recent change in the rates of interest charged to them by the British Treasury, their own rates of interest were changed on loans as of December 9, 1958. The new rates are: on loans for not more than 5 years, 5 percent; on loans for more than 5 years but not more than 10 years, 5½ percent; on loans for more than 10 years but not more than 15 years, 5¾ percent; on loans for more than 15 years, 6½ percent. (World Fishing, January 1959.)

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## MINIMUM PRICES

## FOR WHITE FISH, 1959:

A new schedule of minimum prices for certain white fish was announced by the British Trawlers' Federation effective February 1, 1959.

## United Kingdom (Contd.):

The minimum price of cod, which comprises more than half the landings of white fish in England and Wales, remains unchanged at 56s. (US\$7.84) per ten-stone kit (140 pounds) for the seven months--February to August 1959 (5.6 U.S. cents a pound), and at not less than 66s. (\$9.24) per kit for the five months, September 1959 to February 1960 (6.6 U.S. cents a pound).

The opportunity has also been taken of once again bringing the minimum prices for haddock into line with those for cod--although the price for chat haddock (a new category in the schedule) will remain unaltered at 50s. (\$7.00) per kit (5.0 U.S. cents a pound).

The minimum price for plaice and lemon sole will be 80s. (\$11.20) per kit (8.0 U.S. cents a pound) and for coley (pollock) 40s. (\$5.60) a kit (4.0 U.S. cents a pound).

The prices of all other varieties remain unchanged. (*The Fishing News*, January 2, 1959.)



## Venezuela

## FISHING INDUSTRY TRENDS, 1958:

The Venezuelan fishing industry was able to secure its share of the protectionist measures decreed during 1958. Canned sardines, the most important commercial fish product, were granted increased protection by a decree raising import duties on all types of sardines from Bs. 2.00 per kilo to Bs. 8.00 per kilo (from about US\$0.27 to \$1.09 a pound) effective November 30, 1958. The local industry can supply local needs and Ministry of Agriculture officials believe this increase will eliminate virtually all imports of sardines.

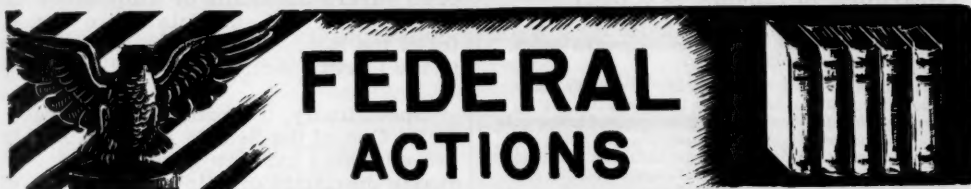
Venezuelan-Japanese interests are joining in a venture to fish and pack tuna in Venezuela. Venezuela's most modern cannery combined with Japanese boats and fishermen should be able to supply local needs and perhaps enter export markets.

The only Venezuelan enterprise freezing fish (almost exclusively shrimp) met its first competition in late 1958 from a new firm which is freezing mackerel, grouper, red snapper, and some shrimp for domestic markets. Significance of these operations will depend upon the extent to which the Venezuelan consumer will learn to use larger amounts of frozen foods.



## BRITISH FREEZING-FISH-AT-SEA EXPERIMENTS

Experiments have been carried out on the production of freezing fish at sea, in a typical British distant-water trawler. The steam trawler *Northern Wave* was specially converted and equipped for the experiments. The problems of the distant-water fishing industry and proposed solutions are discussed. Design and development of the special plant and equipment necessary presented many problems and how they were overcome is fully described. The conclusion reached is that such a plant can be worked by fishermen in all weathers and is a practical proposition for distant-water trawlers. ("Quick Freezing at Sea," *Mod. Refrign*, Great Britain, November 1957, vol. 60, no. 716, pp. 469-474.)



# FEDERAL ACTIONS

## Atomic Energy Commission

### LOW-LEVEL RADIOACTIVE WASTE DISPOSAL IN PACIFIC PROPOSED:

The Atomic Energy Commission gave notice that it proposes to issue a license to Coastwise Marine Disposal Company of Los Angeles, Calif., authorizing disposal of radioactive waste material in the Pacific Ocean. The license would expire on February 28, 1961.

Notice of the proposed issuance was filed with Federal Register on February 25, 1959. The license was scheduled to be issued unless a request for a hearing was filed with the Commission by March 12, 1959.

Under the proposed license, Coastwise Marine would collect low-level waste material in containers meeting Interstate Commerce Commission specifications, from other Commission licensees, using a facility at Long Beach, Calif., as a collection, packaging, and storage point. The waste material received from customers will be packaged to assure safe handling and to withstand loading and unloading operations during transportation. The waste packages for sea disposal will have sufficient density to insure sinking to a depth of 1,000 fathoms (6,000 feet).

The proposed license would limit possession of byproduct material (radioisotopes) by Coastwise Marine to 100 curies at any one time. The license would also provide that during the 2-year period of the license the company could not collect for disposal more than 200 pounds of source material (uranium and thorium) and 100 grams of special nuclear material (Uranium-233, Uranium-235, and plutonium).

The disposal site proposed by the applicant is within a 5-mile radius of the intersection of the parallel of latitude 32°00' north and meridian of longitude 121°30'

west. The area is beyond the continental shelf and lies approximately 130 miles southwest of Point Arguella, Calif. The ocean depth at the proposed dumping site is about 2,000 fathoms.

The containers specified in the proposed license and the disposal location meet the recommendations of the National Committee on Radiation Protection for radioactive waste disposal in the oceans.



## Department of Commerce

### COAST AND GEODETIC SURVEY

#### EXPERIMENTAL SMALL-BOAT CHARTS DEVELOPED FOR EVALUATION:

A large segment of the nation's small-boat owners on January 16, 1959, got their first look at the experimental charts that have been especially designed for use in the cramped quarters of the more than 7 million small craft operated in the United States. The announcement of their publication was made by the Director of the Coast and Geodetic Survey, U. S. Department of Commerce.

The experimental charts, representing the greatest change in nautical charts, since the introduction of color in 1862, have been developed under four different formats, all of which cover the 100 miles of the Potomac River between Washington, D. C., and its mouth at Point Lookout, Md. The opinions of the boating public are sought concerning the experimental formats. The suggestions of boating clubs throughout the country will influence the choice of formats that will be used for charts covering other important waterways.

Although the research and development program was only started in July 1958, the Survey has rushed to completion the following four series for evaluation purposes.

**Series A:** One sheet, 8-fold, printed both sides, at a scale of 1:80,000, with the Washington area at 1:20,000 scale, paper size 15 by 58 inches.

**Series B:** Three sheets, 4-fold, at a scale of 1:80,000, with 1:40,000 scale enlargement of Washington area, 14-1/2 by 32-inch paper, supplemented by photographs of prominent land features and harbors.

**Series C:** Ten sheets, loose-leaf or fixed binding, scale of 1:80,000 coverage, on legal size 8-1/2 by 14-inch paper.

**Series D:** Eight loose-leaf sheets, scale of 1:80,000, on 10-3/4 by 16-1/4-inch paper, including a 1:40,000 scale inset of Washington, D. C.

### Department of Commerce (Cont.)

The charts of series B, C, and D are designed for binders, and series A is an accordion fold type.

Each series covers the same area and contains the same primary information. Large-scale insets of active boating areas supplement the main chart which is printed in four colors. The land area is buff colored and a blue tint indicates a water depth of six feet or less. Danger and restricted areas, velocity and direction of current, mileage marks, and fish traps are shown in red.

Supplemental descriptive information needed by the small-boat owners, and heretofore found only in the Coast Pilot volumes, has been added to the charts in tabular form. These include depths, tides, facilities, such as berths, surfaced launching ramp, hull and engine repairs, marine railway, electricity, toilets and showers, meals, and motor and rowboat rentals. The table also tells the mariner where he can get bait, tackle, gasoline, Diesel oil, water and ice, groceries, hardware, and bottled gas. The information listed on the facility table is also indicated by code number at the exact location on the chart.

The experimental charts also show the signals for storm warnings, rules of the road, call letters and time of weather forecasts by marine radiotelephone stations, and an explanation of the chart symbols and abbreviations.

After the initial showing at New York, the charts were exhibited at the Boat Show in Chicago on February 6, and in San Francisco on February 27. Copies of the experimental editions were distributed to Coast Guard Auxiliary Units, Power Squadrons, Outboard Clubs of America, yachting associations, boating magazines, and numerous individuals who have cooperated with the Survey by their helpful suggestions. Evaluation questionnaires were available to each organization and at the displays.



### Federal Trade Commission

#### CONSENT ORDERS PROHIBIT SEAFOOD PACKERS AND BROKERS FROM MAKING UNLAWFUL BROKERAGE PAYMENTS:

Consent orders (Seafood 7200, 7202, 7204, 7208, and 7249) approved by the Federal Trade Commission on February 27, 1959, require three Seattle, Wash., and one Bellingham, Wash., seafood packers, their subsidiaries, and their associated primary brokers plus an independent Seattle primary broker to stop favoring customers with unlawful brokerage payments.

In taking this action, the Commission affirmed separate initial decisions by one of its hearing examiners based on orders agreed to by the respondents and the Commission's Bureau of Litigation.

These packers and brokers had been charged in complaints with granting fa-

avored buyers discounts or allowances in lieu of brokerage, in violation of Sec. 2 (c) of the Robinson-Patman Amendment to the Clayton Act.

Specifically, the complaints charged that: One of the Seattle packers and his two affiliated cannerys gave certain chains discounts or allowances in lieu of brokerage or lower prices reflecting brokerage. Also, their primary broker passed on brokerage to certain buyers while acting as primary broker for outside packers by selling at net prices lower than those accounted for to its packer-principals, giving allowances or rebates, wholly or partly not charged back to the packers, and taking reduced brokerage on sales.

The Bellingham packer gave direct-buying customers price reductions approximating the brokerage fees which would have been paid had brokers been utilized.

A second Seattle packer, who also acts as broker, granted certain buyers for their own account the customary field brokerage (usually 2½ percent, sometimes 3½ percent), sold at net prices lower than those accounted for to its packer-principals, absorbing all or part of the price difference from its commission; and granted price deductions which were not charged back to the packers but taken from its brokerage.

The independent Seattle primary broker sold at net prices lower than those accounted for to his packer-principals; granted rebates or allowances, wholly or partly not charged back to the packers; and made payments as or in lieu of brokerage to at least one agent of certain buyers, which came from his brokerage earnings and were not charged back.

The third Seattle packer and his exclusive primary broker granted price reductions where either a primary or field broker, or both, were not used or, if used, took a reduced fee. Also, they sold at net prices lower than those accounted for to the packer-principal.

The orders forbid these practices in the future. The agreements are for settlement purposes only and do not con-



## Federal Trade Commission (Cont.)

stitute admissions by the respondents that they have violated the law.

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**DECISION REQUIRES SEATTLE SALMON CANNER TO STOP PAYING ILLEGAL BROKERAGE:**

An initial decision (7201 Canned Seafood) issued January 12, 1959, by a Federal Trade Commission hearing examiner would require a Seattle, Wash., salmon canner to stop favoring customers with illegal brokerage payments. This is not a final decision of the Commission and may be appealed, stayed, or docketed for review.

The concern, the Commission's examiner said, not only sells its own pack of seafood, but acts as primary broker for other packers, generally through field brokers. Its customary brokerage fee is 5 percent which usually is split with the field broker.

In both capacities, the examiner found, the company has granted certain buyers substantial discounts or allowances in lieu of brokerage or price concessions reflecting brokerage. These practices violate Sec. 2(c) of the Robinson-Patman Amendment to the Clayton Act, which forbids sellers to pay brokerage to buyers purchasing for their own account for resale, he ruled.

Ordering the unlawful payments stopped, the examiner stated these typical means were used to make them: (1) allowing favored buyers, or their agents, price reductions offset wholly or partly by cutting the field broker's commission, and (2) granting price concessions reflecting brokerage where brokers were not utilized.

Named in the order was the concern's vice-president and, through stock holdings, the substantial owner.

The examiner's initial decision was based on the evidence presented by the Commission's counsel. The respondents neither filed an answer to the complaint of last July 22 nor appeared at the hearing.

## Department of the Interior

## FISH AND WILDLIFE SERVICE

## BUREAU OF COMMERCIAL FISHERIES

**FROZEN HALIBUT STEAK GRADE STANDARDS ESTABLISHED:**

Voluntary standards for the production of good quality frozen halibut steaks became effective March 15, 1959. Notice of the promulgation of these standards by the U. S. Department of the Interior appeared in the Federal Register February 25, 1959. These voluntary standards were developed by the Bureau of Commercial Fisheries, in cooperation with the fishing industry and the National Fisheries Institute.

Products which conform to these standards are readily identifiable to the consumer. Firms which have continuous inspection are entitled to mark their packages with the Federal shield. Those which subscribe only to sample inspection may certify that the product meets the requirements of the grade specified but cannot use the prefix "U. S." nor the shield.

The standards for frozen halibut steaks apply to clean, wholesome units of raw fish meat with normally associated skin and bone and are 2-oz. or more



in weight. The grades include "U. S. Grade A" and "U. S. Grade B." Quality below these grades would be classified as substandard. Products to be graded must conform to the industry-accepted product description, styles, and grades.

The standards do not define proper labelling for this product. Frozen halibut steaks, when sold in interstate commerce, must conform to the labelling regulations of the Food and Drug Ad-

## Dept. of the Interior (Cont.)

ministration, U. S. Department of Health, Education, and Welfare.

Notice of the proposed halibut standards appeared in the Federal Register December 3, 1958. Interested persons were given until January 1, 1959, to submit views or comments concerning the proposal.

Funds made available by Public Law 466 (83rd Congress), commonly referred to as the Saltonstall-Kennedy Act, have been used to expedite progress on the Bureau's program for the develop-

ment of voluntary Federal standards. The National Fisheries Institute, acting as contract research agency for the Bureau, has supplied the industry liaison essential to the standards program and has furnished consulting services at meetings and conferences on these standards. A committee of industry technologists, representatives of both producers and distributors, actively cooperated with the Bureau's scientific staff in the development of realistic and practical standards.

The standards as published in the Federal Register of February 25, 1959, follow:

## Title 50—WILDLIFE

### Chapter I—Fish and Wildlife Service, Department of the Interior

#### SUBCHAPTER K—PROCESSED FISHERY PRODUCTS, PROCESSED PRODUCTS THEREOF, AND CERTAIN OTHER PROCESSED FOOD PRODUCTS

#### PART 175—UNITED STATES STANDARDS FOR GRADES OF FROZEN HALIBUT STEAKS<sup>1</sup>

On December 3, 1958, a Notice of Proposed Rule Making was published in the Federal Register (23 F.R. 9335) whereby notice was given of the intention of the Director of the Bureau of Commercial Fisheries to recommend to the Secretary of the Interior, the adoption of United States Standards for Grades of Frozen Halibut Steaks, set forth therein in tentative form, to be codified as Title 50, Code of Federal Regulations, Part 175. Interested persons were given until January 1, 1959, to submit views or comments concerning the proposal.

No comments were received by the Bureau on this notice of rule making. Accordingly, the standards set forth below, constituting a new Part 175, Title 50, are adopted pursuant to the authority contained in Title II, section 205, of the Agricultural Marketing Act of 1946, as amended (7 U.S.C. 1624). Functions under that Act pertaining to fish, shellfish, and any products thereof were transferred to the Department of the Interior by section 6(a) of the Fish and Wildlife Act of August 8, 1956 (16 U.S.C. 742e). These regulations shall become effective March 15, 1959.

Dated: February 17, 1959.

FRED A. SEATON,  
Secretary of the Interior.

#### PRODUCT DESCRIPTION, STYLE, AND GRADES

Sec.	
175.1	Product description.
175.2	Styles of frozen halibut steaks.
175.3	Grades of frozen halibut steaks.

#### DIMENSIONS

Sec.	
175.6	Recommended dimensions.

<sup>1</sup> Compliance with the provisions of these standards shall not excuse failure to comply with the provisions of the Federal Food, Drug and Cosmetic Act.

#### FACTORS OF QUALITY AND GRADE

175.11	Ascertaining the grade.
DEFINITIONS AND METHODS OF ANALYSIS	
175.21	Definitions and methods of analysis.
LOT CERTIFICATION TOLERANCES	
175.25	Tolerances for certification of officially drawn samples.

#### SCORE SHEET

175.31	Score sheet for frozen halibut steaks.
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AUTHORITY: §§ 175.1 to 175.31 issued under sec. 205, 60 Stat. 1090, as amended; 7 U.S.C. 1624.

#### PRODUCT DESCRIPTION, STYLES, AND GRADES

##### § 175.1 Product description.

Frozen halibut steaks are clean, wholesome units of frozen raw fish flesh with normally associated skin and bone and are 2 ounces or more in weight. Each steak has two parallel surfaces and is derived from whole or subdivided halibut slices of uniform thickness which result from sawing or cutting perpendicularly to the axial length, or backbone, of a whole halibut. The steaks are prepared from either frozen or unfrozen halibut (*Hippoglossus* spp.) and are processed and frozen in accordance with good commercial practice and are maintained at temperatures necessary for the preservation of the product.

##### § 175.2 Styles of frozen halibut steaks.

(a) *Style I, random weight pack.* The individual steaks are of random weight and neither the weight nor the range of weights are specified.

(b) *Style II, uniform weight or portion pack.* All steaks in the package or in the lot are of a specified weight or range of weights.

##### § 175.3 Grades of frozen halibut steaks.

(a) "U.S. Grade A" is the quality of frozen halibut steaks which possess good flavor and odor, and that for those factors which are rated in accordance with the scoring system outlined in the following sections the total score is not less than 85 points.

(b) "U.S. Grade B" is the quality of frozen halibut steaks which possess at least reasonably good flavor and odor, and that for those factors which are

rated in accordance with the scoring system outlined in the following sections the total score is not less than 70 points.

(c) "Substandard" is the quality of frozen halibut steaks which fail to meet the requirements of the "U.S. Grade B."

#### DIMENSIONS

##### § 175.6 Recommended dimensions.

(a) The recommended dimensions of frozen halibut steaks are not incorporated in the grades of the finished product since dimensions, as such, are not factors of quality for the purpose of these grades. However, the degree of uniformity of thickness among units of the finished product is rated since it is a factor affecting the quality and utility of the product.

(b) It is recommended that the thickness (smallest dimension) of individually frozen halibut steaks be not less than ½ inch and not greater than 1¼ inches.

#### FACTORS OF QUALITY AND GRADE

##### § 175.11 Ascertaining the grade.

The grade is ascertained by observing the product in the frozen, thawed, and cooked states and is evaluated by consideration of the following:

(1) *Factors rated by score points.* The quality of the product with respect to scored factors is expressed numerically. Cumulative point deductions are assessed for variations of quality for each factor in accordance with the schedule in Table I, in the frozen, thawed, and cooked states. The total deduction is subtracted from the maximum possible score of 100 to obtain the product score.

(2) *Factors not rated by score points.* The factors of flavor and odor are evaluated organoleptically in the cooked state for both the light and dark meat (surface fat) and are defined as follows:

(i) *Good flavor and odor.* "Good flavor and odor" (essential requirement for Grade A) means that the fish flesh has the good flavor and odor characteristics of halibut, and is free from rancidity and from off-flavors and off-odors.

(ii) *Reasonably good flavor and odor.* "Reasonably good flavor and odor" (minimum requirement for Grade B) means that the fish flesh may be somewhat lacking in the good flavor and odor characteristic of halibut, is reasonably free of rancidity, and is free from objectionable off-flavors and off-odors.

(iii) *Substandard flavor and odor.* "Substandard flavor and odor" (Substandard grade) means that the flavor and odor fall to meet the requirements of "reasonably good flavor and odor."

(3) *Determination of final product grade.* The final product grade is derived on the basis of both the product score as determined by the "factors rated by score points" and the grade requirements of flavor and odor as defined under "factors not rated by score points." The lower of the two determines the final grade.

#### DEFINITIONS AND METHODS OF ANALYSIS

##### § 175.21 Definitions and methods of analysis.

(a) "Percentage glaze" on halibut steak means the percent by weight of frozen coating adhering to the steak surfaces and includes the frost within the package. It is determined by the method described below or by methods giving equivalent results.

(1) *Equipment needed.* (i) Source of cold tap water with aerated faucet.  
(ii) Balance accurate to 0.1 gm.; or 0.01 ounce.

(iii) Paper towels.  
(iv) Small knife.

(2) *Procedure.* (i) Weigh package in overwrap and all its contents (A).  
(ii) Remove steaks and loose frost; weigh dry packaging (B).

(iii) The difference in weight, A-B represents weight of steaks plus glaze (C).  
(iv) Remove glaze from halibut steaks.

(a) Adjust tap water to a flow rate of about 3 quarts/min. through an aerated faucet.

(b) Direct 50° to 60° F. tap water onto skin side of steak while gently feeling and rubbing cut surfaces with finger tips (if necessary, temperatures up to 80° F. may be used but require closer control).

(c) When all glaze is removed from cut flesh surface, as evidenced by absence of slick feel to fingers, remove steak from water.

(d) Rapidly remove excess water with single paper towel before it has time to refreeze on the steak, and flick off residual skin glaze by knife or hand.

(e) Repeat steps (b), (c), and (d) on each steak in package or sample unit.

(f) Weigh de-glazed halibut steaks (D, actual net weight of sample).

(Steps (a) through (f) of this subdivision are completed within three minutes.)

(v) Calculate percentage glaze: Percentage glaze =  $\frac{C-D}{D} \times 100$ .

(b) "Cooked state" means that the thawed product has been cooked in a suitable manner which is defined as being heated submerged in boiling water, unseasoned, and in a boilable film type pouch for ten minutes. (Steaks over one inch in thickness may require five additional minutes of heating.)

(c) Uniformity of thickness means that the thickness is substantially the same for one or more steaks within a package or sample unit.

(d) Color defects:

(1) "Discoloration of drip liquor" means that the free liquid which drains from the thawed steaks is discolored with blood residue usually from the dorsal aorta of the halibut.

(2) "Discoloration of light meat" means that the normal flesh color of the main part of the halibut steak has darkened due to deteriorative influences.

(3) "Discoloration of the dark meat" means that the normal color of the surface fat shows increasing degrees of yellowing due to oxidation.

(4) "Non-uniformity of color" refers to noticeable differences in color on a single steak or between adjacent steaks in the same package.

(e) "Dehydration" refers to the appearance of a whitish area on the surface of a steak due to the removal of water or drying of the affected area.

(f) "Honeycombing" refers to the visible appearance of numerous discrete holes or openings of varying size on the steak surface.

(g) "Workmanship defects" refers to appearance defects that were not eliminated during processing and are considered either objectionable or poor commercial practice.

(h) "Texture defect" refers to an undesirable increase in toughness and/or dryness, fibrousness, and watery nature of halibut examined in the cooked state.

#### LOT CERTIFICATION TOLERANCES

§ 175.25 Tolerances for certification of officially drawn samples.

The sample rate and grades of specific lots shall be certified on the basis of Part 170 of this chapter (23 F.R. 5064).

#### SCORE SHEET

##### § 175.31 Score sheet for frozen halibut steaks.

General	
Label.....	
Size and kind of container.....	
Container mark or identification.....	
Size of lot.....	
Number of samples.....	
Actual net weight (ounces).....	
Number of steaks per container.....	
Product style.....	

Scored factors (table 1)	Deductions
Frozen:	
1. Dehydration.....	
2. Percentage glaze.....	
3. Uniformity of thickness.....	
4. Uniformity of weight.....	
Thawed:	
5. Workmanship.....	
6. Color defects.....	
7. Honeycombing.....	
Cooked:	
8. Texture.....	
Total deductions.....	
Rating for scored factors (100—Total deductions).....	
Unscored factors.....	Rating
Cooked:	
a. Odor.....	
b. Flavor (light meat).....	
c. Flavor (dark meat).....	
Flavor and odor rating.....	
Final grade.....	

TABLE 1—SCHEDULE OF POINT DEDUCTIONS FOR FACTORS RATED BY SCORE POINTS<sup>1</sup>

Factor	Description of quality variation	Deduct
<b>Frozen</b>		
1. Dehydration <sup>2</sup> .....	Surface area affected: Less than 1 square inch but obvious..... 1 to 2 square inches..... Above 2 square inches.....	1 2 3
2. Percentage glaze.....	Over 0.0, not over 6.0 percent by weight of sample unit..... Over 6.0, not over 7.0..... Over 7.0, not over 8.0..... Over 8.0, not over 9.0..... Over 9.0.....	0 1 2 3 4
3. Uniformity of thickness.....	For each 1/4 inch above 1 1/4-inch variation in steak thickness (maximum total deduction permitted 6 points per sample unit).....	2
4. Uniformity of weight and minimum weight.....	Style I—Random weight.—Use either (a) or (b), whichever gives a greater deduction. (a) For each steak less than 3.0 ounces in weight per sample package..... (b) For each 0.1 ounce below 4.0 ounces in average steak weight per sample..... Style II—Uniform weight or portions.—For each full percent of the steaks deviating by more than 0.5 ounce from the specified portion weight or the average of the specified portion range (per sample package).....	4 16 2
<b>Thawed</b>		
5. Workmanship—Defects of: Cutting, collar bone, loose skin, fins, blood spots, bruises, foreign material, backbone, cartilage, sawdust.....	Slight or moderate..... Excessive.....	1 2
6. Color defects:	(Per sample unit)	
(a) Discoloration of drip liquor.....	Slight..... Moderate..... Excessive.....	1 2 3
(b) Discoloration of light meat <sup>2</sup> .....	Slight..... Moderate..... Excessive.....	1 2 3
(c) Discoloration of dark meat <sup>2</sup> .....	Slight..... Moderate..... Excessive.....	1 2 3
(d) Non-uniformity of color.....	Slight..... Moderate..... Excessive.....	1 2 3
7. Honeycombing <sup>2</sup> .....	Surface area affected: (Per steak) 25 to 50 percent..... 51 to 75 percent..... 76 to 100 percent.....	16 3 3
<b>Cooked</b>		
8. Texture defect <sup>2</sup> (tough, dry, fibrous, or watery).....	(Per steak) Slight..... Moderate..... Excessive.....	1 2 3

<sup>1</sup> This schedule of point deductions is based on the examination of sample units composed of: (a) An entire sample package and its contents (for retail sized packages) or (b) a representative subsample consisting of three or more halibut steaks taken from each sample package (for institutional sized packages), except that the entire sample package shall be examined for factor 4.

<sup>2</sup> Point deductions for these factors are based on a 3 steak sample unit. For samples containing other than 3 steaks per sample unit or per package, multiply the results by the correction factor  $\frac{3}{n}$  where n equals the number of steaks.

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Dept. of the Interior (Cont.):

#### **PROPOSED REGULATIONS ON FISHING VESSEL MORTGAGE INSURANCE:**

Regulations and procedures for a fishing vessel mortgage and loan program, designed to facilitate construction of modern fishing vessels, were submitted on January 22, 1959, by the Secretary of the Interior. The proposed regulations were published in Federal Register on January 23, 1959, and interested parties were given 30 days from the date of publication to submit comments.

The function was transferred from the Maritime Administration, Department of Commerce, in April 1958, under the provisions of the Fish and Wildlife Act of 1956.

The program, when activated, will be operated by the U. S. Bureau of Commercial Fisheries. The Bureau reports that there is considerable interest being evidenced by fishermen and private financial institutions in the program.

Under this program the Government guarantees the repayment of mortgages and loans up to 75 percent of the vessel cost. For this guarantee, the vessel owner will pay the Government a premium of one percent annually on the amount due on mortgages and one-half of one percent on loans for construction.

A mortgage cannot be granted until the vessel has been constructed and registered; the term "loan" applies to that period before completion and registry. Mortgage insurance will be limited to 15 years for a vessel. The vessel owner will protect his investment against insurable losses through private companies.

#### **BUREAU OF SPORT FISHERIES AND WILDLIFE**

##### **ALASKA ACTING REGIONAL DIRECTOR APPOINTED:**

The appointment of Urban C. Nelson as acting regional director in Alaska for the Bureau of Sport Fisheries and Wildlife, United States Fish and Wildlife Service, was announced February 13, by the Department of the Interior. Nelson succeeds, in an acting capacity, to the post held by Clarence Rhode who disappeared with two other persons last August dur-

ing an aircraft flight in the Brooks Range area of Arctic Alaska.

Nelson has been serving as Chief of the Bureau's Division of Fish and Game Restoration, with headquarters at the Regional Office in Juneau. In this position he has been responsible for supervising and coordinating the Bureau's Federal Aid in fish and wildlife restoration and the refuge programs in Alaska. Nelson has been with the Service in Alaska since 1948 when he transferred from the Soil Conservation Service of the Department of Agriculture, at Stillwater, Minn. He is a native of Minneapolis, Minn., and holds a B. S. degree from the University of Minnesota.



#### **Department of Labor**

##### **WAGE AND HOUR AND PUBLIC CONTRACTS DIVISION**

##### **INTERPRETATIVE BULLETIN ISSUED ON FISHERY INDUSTRIES EXEMPTIONS UNDER FAIR LABOR STANDARDS ACT:**

The application of exemptions from the Fair Labor Standards Act for employees in the fishery and seafood industries is discussed in an interpretative bulletin (Part 784 of Title 29, Code of Federal Regulations) issued on February 11, 1959, by the Administrator of the U. S. Labor Department's Wage and Hour and Public Contracts Division. The bulletin went into effect the day of issue.

The new bulletin serves as a practical guide to employers and employees on how the Divisions interpret two exemptions. One is a minimum-wage and overtime pay exemption for workers employed in catching, processing, distributing, and performing other specified operations on fish and other aquatic products.

The bulletin explains the application of this exemption both to "offshore" and "shore" activities, and points out that it cannot be taken for processing or distributing nonperishable aquatic products.



## Dept. of Labor (Cont.):

The other exemption is one from the overtime-pay provisions--but not the minimum-wage requirements--applying to workers employed in canning fish and



other aquatic products. The bulletin indicates what activities are included in the term "canning" and makes it clear that the exemption applies only to employees whose activities are an integral part of the canning operation.

## Title 29—LABOR

## Chapter V—Wage and Hour Division, Department of Labor

## SUBCHAPTER B—STATEMENTS OF GENERAL POLICY OR INTERPRETATION NOT DIRECTLY RELATED TO REGULATIONS

PART 784—SCOPE AND APPLICABILITY OF EXEMPTIONS PROVIDED BY SECTIONS 13(a)(5) AND 13(b)(4) OF THE FAIR LABOR STANDARDS ACT OF 1938 AS AMENDED<sup>1</sup>

In accordance with section 3 of the Administrative Procedure Act (60 Stat. 238, 5 U.S.C. 1002), and pursuant to authority hereinafter cited, Title 29 Code of Federal Regulations, Part 784 is hereby amended to read as follows:

- Sec.  
784.0 Introductory statement.  
784.1 Guiding interpretative principles.  
784.2 Employment in exempt, nonexempt, and noncovered work during a workweek.  
784.3 Off or dead season work.  
784.4 Addition of foreign ingredients to the aquatic forms of animal and vegetable life.  
784.5 General character of the section 13(a)(5) exemption.  
784.6 General scope of section 13(a)(5) exemption.  
784.7 Office, clerical and maintenance employees.  
784.8 Off-shore activities.  
784.9 Shore activities—"Loading, unloading, or packing of such products for shipment".  
784.10 Processing (other than canning), freezing, and curing.  
784.11 Fish and seafood wholesaling.  
784.12 Processing or manufacturing operations which are not within the exemption.  
784.13 Definition of canning under section 13(b)(4).  
784.14 "Necessary preparatory operations".  
784.15 "Thermically sealing and sterilizing or pasteurizing".  
<sup>1</sup>29 U.S.C. 201-219.

## 784.16 Subsequent operations.

## 784.17 Exempt and nonexempt employees.

AUTHORITY: §§ 784.0 to 784.17 issued under 52 Stat. 1000 (29 U.S.C. 201-219). Interpret or apply 52 Stat. 1007 (29 U.S.C. 213).

## § 784.0 Introductory statement.

(a) Scope and significance: (1) The purpose of this part is to make available in one place the general interpretations of the Department of Labor pertaining to the exemptions provided in section 13(a)(5) and 13(b)(4) of the Fair Labor Standards Act of 1938, as amended.<sup>2</sup> It is intended that the positions stated will serve as "a practical guide to employers and employees as to how the office representing the public interest in its enforcement will seek to apply it."<sup>3</sup> These interpretations contain the construction of the law which the Secretary of Labor and the Administrator believe to be correct and which will guide them in the performance of their duties under the Act, unless and until they are otherwise directed by authoritative decisions of the courts or conclude upon the examination of an interpretation that it is incorrect. To the extent that prior administrative rulings, interpretations, practices and enforcement policies relating to sections 13(a)(5) and 13(b)(4) are inconsistent or in conflict with the principles stated in this part, they are hereby rescinded. The interpretations contained herein may be relied upon in accordance with section 10 of the Portal to Portal Act,<sup>4</sup> so long as they remain effective and are not modified, amended, rescinded, or determined by judicial authority to be incorrect.

<sup>1</sup>Under Reorganization Plan No. 6 of 1950 and pursuant to General Order No. 45-A issued by the Secretary of Labor on May 24, 1950; interpretations of the provisions (other than the child labor provisions) of the Act are issued by the Administrator of the Wage and Hour Division. See 15 F.R. 3290.

<sup>2</sup>Sidmore v. Swift & Co., 323 U.S. 134, 138.

<sup>3</sup>29 U.S.C. 251-262.

Also discussed are such subjects as how the exemptions apply when employees do work within the scope of both exemptions, and their application to office, clerical, and maintenance employees.

Unless specifically exempt, employees covered by the Act must be paid at a rate of at least \$1.00 an hour and not less than one and one-half times their regular rate of pay for all hours worked in excess of 40 in a workweek. The Act covers employees engaged in interstate commerce or the production of goods for interstate commerce, including any closely related process or occupation directly essential to such production.

The new interpretative bulletin, part 784, of Title 29, Code of Federal Regulations, as published in the Federal Register of February 11, 1959, follows:

(2) The Fair Labor Standards Act applies to employees engaged in interstate or foreign commerce or in the production of goods for such commerce, including any closely related process or occupation directly essential to such production. It requires the payment to these covered employees of a prescribed minimum hourly wage rate, and overtime compensation of not less than one and one-half times the employees' regular rates of pay for all hours worked in excess of 40 in a workweek, unless such employees are exempt from one or both of these requirements by virtue of some specific provision of the Act such as section 13(a)(5) or section 13(b)(4).

(3) Neither the minimum wage nor overtime provisions of the Act apply to employees who are exempt under section 13(a)(5). However, employees who come within the scope of section 13(b)(4) must be paid the prescribed minimum wage but need not be paid the statutory overtime compensation.

(4) Section 13(a)(5) applies to "any employee employed in the catching, taking, harvesting, cultivating, or farming of any kind of fish, shellfish, crustacea, sponges, seaweeds, or other aquatic forms of animal and vegetable life, including the going to and returning from work and including employment in the loading, unloading, or packing of such products for shipment or in propagating, processing (other than canning), marketing, freezing, curing, storing, or distributing the above products or by-products thereof."

(5) Section 13(b)(4) applies to "any employee employed in the canning of any kind of fish, shellfish, or other aquatic forms of animal or vegetable life, or any byproduct thereof;"<sup>5</sup>

<sup>4</sup>Formerly "canning" was included in section 13(a)(5), but the 1949 Amendments explicitly removed "canning" from this section and enacted the separate section 13(b)(4).

### § 784.1 Guiding interpretative principles.

(a) It is clear that Congress intended the Fair Labor Standards Act to be broad in its scope. "Breadth of coverage is vital to its mission," and any exemption from its coverage must be narrowly construed and applied only to those employees who are plainly and unmistakably within its terms and spirit. This construction of the exemptions is necessary to carry out the broad remedial objectives for which the Act was passed.<sup>1</sup>

(b) An examination of the terminology in which the exemptions from the general coverage of the Fair Labor Standards Act are stated discloses language patterns which reflect congressional intent. Thus, Congress differentiated as to whether employees are to be exempt because they are employed by a particular employer, employed in a particular type of establishment, employed in a particular industry, or employed in a particular capacity or operation.<sup>2</sup>

(c) The language in both sections 13(a) (5) and 13(b) (4), the legislative history, and court decisions make clear that these exemptions are not to be interpreted as though they were intended to grant an exemption to all employees employed in the fishing industry or in the fish canning industry.<sup>3</sup> By their own terms, the exemptions are applicable only to employees employed in certain specified capacities or occupations. Though a person may be employed in an occupation closely related and directly essential to the catching, processing, or canning of fish so as to bring him within the coverage of the Act, if his activities are not an integral part of the catching,

<sup>1</sup> *Powell v. U.S. Cartridge Co.*, 339 U.S. 497.

<sup>2</sup> *Phillips v. Walling*, 324 U.S. 490; *Calaf v. Gonzalez*, 127 F. 2d 934 (C.A. 1); *Bowie v. Gonzalez*, 117 F. 2d 11 (C.A. 1); *Mitchell v. Stinson*, 217 F. 2d 210 (C.A. 1); *Fleming v. Hawkeye Pearl Button Co.*, 113 F. 2d 52 (C.A. 8).

<sup>3</sup> See *Mitchell v. Stinson*, 217 F. 2d 210 (C.A. 1), wherein the court in considering the various types of exemptions contained in the Act stated that the applicability of sections 13(a) (5) and 13(b) (4) depended on the capacity in which the particular employee was acting.

<sup>4</sup> See 88 Cong. Rec. 7443 where the sponsor of the exemption as it finally appeared in the original Act stated: "This amendment is not the same. In the last amendment I was trying to define the fishing industry. I am now dealing with those persons who are exempt." See also 83 Cong. Rec. 7408, 7421-23, 7443; Conf. Rep. No. 1453, 81st Cong. 1st Sess. (1949); U.S. Code Cong. Serv. 1949, Vol. 2 p. 2208; *Mitchell v. Stinson*, 217 F. 2d 210 (C.A. 1); *Dise v. Maddrix*, 144 F. 2d 584 (C.A. 4), affirmed 324 U.S. 697.

<sup>5</sup> Compare *McComb v. Consolidated Fisheries Co.*, 174 F. 2d 74 (C.A. 3), which was decided before the *Stinson* case and before the Supreme Court's decision in the *Farmers' Irrigation* case, 337 U.S. 755, and also before the enactment of the 1949 amendments. As pointed out in the *Stinson* decision, the reasoning of the *Consolidated Fisheries* decision is inconsistent with the legislative history and is therefore "not persuasive" authority (217 F. 2d at 216). Also, the reasoning of the *Consolidated Fisheries* decision is directly opposite to that of the Supreme Court's subsequent decision in the *Farmers' Irrigation* case, 337 U.S. at 759-760, in particular Footnote 7, where *Dise v. Maddrix* is cited with approval.

processing, or canning of fish, the respective exemptions would not be available."

### § 784.2 Employment in exempt, non-exempt, and noncovered work during a workweek.

(a) The wage and hour requirements of the Act do not apply to any employee during any workweek in which a portion of his activities falls within section 13(a) (5) if no part of the remainder of his activities is covered by the Act. Similarly, the overtime requirements are inapplicable in any workweek in which a portion of an employee's activities falls within section 13(b) (4) if no part of the remainder of his activities is covered by the Act.

(b) Where an employee, during any workweek, performs work that is exempt under section 13(a) (5) or 13(b) (4), and also performs nonexempt work, some part of which is covered by the Act, the exemption will be deemed inapplicable unless the time spent in performing non-exempt work during that week is not substantial in amount. For enforcement purposes, nonexempt work will be considered substantial in amount if more than 20 percent of the time worked by the employee in a given workweek is devoted to such work. However, where exempt and nonexempt work is performed during a workweek by an employee and is not or cannot be segregated so as to permit separate measurement of the time spent in each, the employee will not be exempt.<sup>6</sup>

(c) The combination of exempt work under section 13(a) (5) and 13(b) (4); or of one of these sections with exempt work under another section of the Act, is permitted. Where a part of an employee's covered work in a workweek is exempt under section 13(a) (5) and the remainder is exempt under another section which grants an exemption from the minimum wage and overtime provisions of the Act, the wage and hour requirements would not be applicable. If the scope of the exemptions is not the same, however, the exemption applicable to the employee is that provided by whichever exemption provision is more limited in extent unless, of course, the time spent in performing work which is nonexempt under the broader exemption is not substantial. For example, an employee may devote part of his workweek to work within section 13(b) (4) and the remainder to work exempt from both the minimum wage and overtime requirements under another section of the Act. In such a case he must receive the minimum wage but is not required to receive time and one-half for his overtime work during that week.<sup>7</sup> Each activity is

<sup>6</sup> *Mitchell v. Stinson*, 217 F. 2d 210 (C.A. 1); *Dise v. Maddrix*, 144 F. 2d 584 (C.A. 4), affirmed 324 U.S. 697. See also *Farmers' Irrigation Co. v. McComb*, 337 U.S. 755 wherein the Supreme Court held that the agricultural exemption which is similarly worded must be strictly limited to the particular specified operations, exclusive of activities which, though necessary or even indispensable to the specified operation were not actually a part of the operation itself.

<sup>7</sup> *Mitchell v. Stinson*, 217 F. 2d 210 (C.A. 1); *Walling v. Public Quick Freezing and Cold Storage Co.*, 63 F. Supp. 924 (S.D. Fla.).  
<sup>8</sup> Cf. *Mitchell v. Myrtle Grove Packing Co.*, 350 U.S. 891; *Tobin v. Blue Channel Corp.*, 198 F. 2d 245 (C.A. 4).

tested separately under the applicable exemption as though it were the sole activity of the employee for the whole workweek in question. Unless the employee meets all the requirements of each exemption a combination exemption would not be available.

### § 784.3 Off or dead season work.

Generally, work such as the repair and maintenance of fishing equipment and of processing and canning equipment and machinery during the dead or inactive season is not exempt.<sup>8</sup> Consequently, the repair and maintenance of processing and canning machinery and equipment before or after the close of the active season are not exempt. Similarly, the repair of fishing equipment at the end of the active season would be non-exempt work. On the other hand, the repair of fishing equipment, such as boats, nets and traps immediately prior to the beginning of the fishing season has a sufficiently close relationship to the exempt operations so as to bring the employees of an employer engaged in fishery operations who are employed in such duties within the exemption. In any event, nonexempt work performed in the inactive season is closely related and directly essential to the production of goods for commerce which takes place during the active season and, therefore, is subject to the provisions of the Act.<sup>9</sup>

### § 784.4 Addition of foreign ingredients to the aquatic forms of animal and vegetable life.

(a) By their terms, sections 13(a) (5) and 13(b) (4) provide no exemption with respect to operations performed on any products other than the aquatic products named in these subsections. Accordingly, neither of the exemptions is applicable to the making of any commodities from ingredients only part of which consist of such aquatic products, if a substantial amount of other products is contained in the commodity so produced.<sup>10</sup> Thus, the canning or processing of codfish cakes, clam chowder, dog food, crabcakes or livestock feed containing aquatic products is often not exempt within the meaning of either section 13(a) (5) or section 13(b) (4).

(b) To exempt employees employed in processing or canning products composed of the named commodities and a substantial amount of ingredients not named in the exemptions would be contrary to the language and purposes of such exemptions which specifically enumerate the commodities on which exempt operations were intended to be performed. Consequently, all operations performed on the mixed products at and from the time of the addition of the foreign ingredient are not exempt.<sup>11</sup>

<sup>11</sup> See *Mandis v. Walrus Agricultural Co.*, 349 U.S. 254; *Mitchell v. Stinson*, 217 F. 2d 210 (C.A. 1); *Malsone v. Central Colorado Labor Cases (CCH)* par. 61,337, 2 WH Cases 752 (D. P.R.); *Abram v. San Joaquin Cotton Oil Co.*, 49 F. Supp. 393 (S.D. Calif.), and *Heaburg v. Independent-Oil Company*, 46 F. Supp. 751 (W.D. Tenn. E.D.).  
<sup>12</sup> *Farmers' Irrigation Co. v. McComb*, 337 U.S. 755; *Mitchell v. Stinson*, 217 F. 2d 210 (C.A. 1); *Bowie v. Gonzalez*, 117 F. 2d 11 (C.A. 1); *Weaver v. Pittsburgh Steamship Co.*, 153 F. 2d 597 (C.A. 8), cert. den. 328 U.S. 958.  
<sup>13</sup> Cf. *Walling v. Bridgmann-Russell Co.*, 6 Labor Cases (CCH) par. 61,422, 2 WH Cases 785 (D. Minn.); *Muller v. Litchfield Creamery Co.*, 11 Labor Cases (CCH) par. 63, 247, 5 WH Cases 1039 (N.D. Ind.).

redients, including those activities which are an integral part of processing or canning, would be nonexempt activities. However, activities performed in connection with the processing (other than canning) of the named aquatic products prior to the addition of the foreign ingredients would be deemed exempt processing under section 13(a)(5). Where the commodity produced contains an insubstantial amount of products not named in the exemption, the handling and preparation of the foreign ingredients for use in the exempt operations would also be considered as exempt activities.

(c) As an enforcement policy in applying the principles stated in this section, if more than 20 percent of a commodity consists of products other than aquatic products named in section 13(a)(5) or 13(b)(4), the commodity will be deemed to contain a substantial amount of such nonaquatic products.

#### § 784.5 General character of the section 13(a)(5) exemption.

(a) As indicated by the legislative history, the purpose of the exemption is to except from the minimum wage and overtime provisions of the Act those activities in the fishing industry that are controlled or materially affected by natural factors or elements, such as the vicissitudes of the weather, the changeable conditions of the water, the run of the catch, and the perishability of the products obtained.<sup>12</sup>

(b) The activities enumerated in section 13(a)(5) fall into two general groups. The first group, which embraces "the catching, taking, harvesting, cultivating, or farming of any kind of fish, shellfish, crustacea, sponges, seaweeds or other aquatic forms of animal and vegetable life, including the going to and returning from work" includes those "off shore" or "trip" activities which have to do with the procurement or appropriation from nature of seafood and other forms of aquatic life, and which depend to a considerable degree on natural factors. The activities described in the latter part of the exemption, embracing "the loading, unloading, or packing of such products for shipment or . . . propagating, processing (other than canning), marketing, freezing, curing, storing or distributing the above products or byproducts thereof," are "shore" activities which in general have to do with the movement of the perishable products to a nonperishable state or to points of consumption. This latter part of the exemption may be considered as intended to implement and supplement the first part by exempting "shore" activities which are necessarily somewhat affected by the same natural factors as the "offshore" or "trip" activities mentioned in the first part of the subsection. These "shore" activities are affected primarily, however, by fluctuations in the supply of the product or by the necessity for consumption or preservation of such products before spoilage occurs.

(c) Activities performed after the conversion of an aquatic product to a nonperishable state cannot form the basis for application of the exemption

unless the subsequent operation is an integral part of exempt operations on the aquatic forms of animal and vegetable life mentioned in section 13(a)(5). The exemption is, consequently, not available for the handling or shipping of nonperishable products by an employer who did not commence operations on the product in a perishable state. Thus, employees of dealers in or distributors of such nonperishable products as fish oil and fish meal, or canned seafood, are not within the exemption. Similarly, there is no basis for application of the exemption to employees employed in further processing or manufacturing operations on products previously rendered nonperishable, such as refining fish oil or handling fish meal in connection with the manufacture of feeds.

(d) In applying the principle stated in paragraph (c) of this section, the Divisions have not asserted that the exemption is inapplicable to the performance of the operations described in section 13(a)(5) on frozen, smoked, salted, or cured fish. They will continue to follow this rule until further clarification from the courts.

(e) As has been noted previously, employees may at times engage in activities which would bring them within the exemption provided by section 13(a)(5) and at other times may engage in activities which would be nonexempt. When this occurs, the principles stated in § 784.2(b) will determine the applicability of the exemption in specific workweeks.

#### § 784.6 General scope of section 13(a)(5) exemption.

(a) Despite its comprehensive reach, the legislative history and the court decisions make it clear that the exemption does not extend to every operation performed in the fishing industry. The scope of the named operations or activities is conditioned by the unpredictable natural factors in the industry, the perishability of the aquatic products, and the time when the operations are performed. While an employee may in a sense perform the identical work for the same purpose in two given situations, in one case a relationship may exist to cause the work to be exempt, while in the other case such relationship may be absent, causing work to be nonexempt. For example, the time at which the particular work is performed may in some cases determine whether the work is exempt, such as when certain kinds of work are done during the inactive season as compared to the active season.

(b) The exemption does not apply where the work is not sufficiently closely related to a named operation to be a part of the operation. Clearly, the actual performance of the operations enumerated in the exemption, such as the catching of fish, and the freezing of fish, are within the exemption. Whether other operations or activities are within the exemption depends on their relationship to the enumerated activities.

(c) Only those operations that are an integral part of an enumerated operation are considered sufficiently closely related to the named operation to be a part of it. Generally, the usual duties performed in connection with a named operation are an integral part of the operation. For example, the spreading of ice on fresh fish packed for shipment is part

of the packing of fish. Similarly, work which contributes directly to the continuous operation of fishing boats or processing equipment or other exempt activity bears the necessary relationship. On the other hand, such work as making ice for use in packing fish cannot be said to be a part of the packing operations so as to be exempt.<sup>13</sup> The exemption does not extend to the manufacture of products for use in the exempt operations, such as boxes for shipment of fish or rubber boots for fishermen.

#### § 784.7 Office, clerical and maintenance employees.

(a) Unless office, clerical and maintenance employees are engaged in activities which are an integral part of the named operations, they are nonexempt. For example, office and clerical employees of a firm which is engaged in operating fishing boats or selling fish are not within section 13(a)(5) except when they perform marketing or distributing activities such as selling, taking and putting up orders, recording sales, taking cash, and making telephone connections for customer or dealer calls. Whether a clerical employee working in a processing plant is exempt likewise depends on the relationship of his activities to the named operations. The work of a tallyman counting fish as they are unloaded at the plant is within the exemption as an integral part of the unloading operation. Bookkeepers, stenographers, typists, file clerks, and others who perform general office work such as posting to ledgers, sending bills and making up payrolls are not within the section 13(a)(5) exemption.

(b) Similarly, such employees as kitchen and restaurant workers who prepare and serve food to the employees engaged in exempt processing operations, laboratory workers who perform research in fishery products, and bus drivers transporting workers to and from the plant are not within the exemption.<sup>14</sup>

(c) The repair and maintenance of the processing plant, whether performed during the "active" or "dead" season, are generally not within section 13(a)(5) because such activities are not sufficiently closely related to the named operations. It follows that employees such as carpenters, repairmen, and janitors engaged in general maintenance work, and watchmen are not exempt. However, if the repairman or other employee is engaged in repairing, oiling or greasing machinery or equipment which is currently used in the actual processing operations or in making repairs in the production room, such as to the floor or around the processing equipment or machinery, which repair is essential to prevent interruption to the processing operation, the exemption would apply. Employees who clean the processing machinery or equipment in order to prevent interruptions or breakdowns are also so closely related to the processing as to be part of it. Similarly, the providing of heat which is used for the exempt processing is an exempt activity.

(d) Certain warehousing activities are ordinarily performed in connection with the processing operations. Articles such

<sup>12</sup> See footnote 10 and cases there cited.

<sup>13</sup> Cong. Rec. 7408, 7443; *Fleming v. Hawkeye Pearl Button Co.*, 113 F. 2d 82 (C.A. 8); *Walling v. W. D. Haden*, 153 F. 2d (C.A. 5), cert. den. 328 U.S. 866.

<sup>14</sup> See *Mitchell v. Stinson*, 217 F. 2d 216 (C.A. 1), so holding in an analogous situation under section 13(b)(4).



as salt, condiments, cleaning supplies, and boxes or other containers, are received and stored in the warehouse for use in connection with the processing operations. The unloading and storing of these ingredients and supplies in the plant or warehouse for subsequent use in the processing operation would not be exempt operations. On the other hand, the delivery of these ingredients or supplies from stock to meet the daily needs of the processing department would be exempt work. For example, assembling boxes to be currently used in packing fish would be exempt, whereas the receiving, unloading and storing of the knocked-down or already formed boxes, or the assembling of boxes for stock to be used at some relatively remote future time, would not be exempt work.

#### § 784.8 Off-shore activities.

(a) *In general.* (1) The expression "off-shore activities" is used to describe the category of named operations pertaining to the acquisition from nature of aquatic forms of animal and vegetable life. The "catching, taking, harvesting, cultivating, or farming" of the various forms of aquatic life includes not only the actual performance of the activities, but also the usual duties inherent in the occupations of those who perform the activities. Thus, the fisherman who is engaged in "catching" and "taking" must see to it that his lines, nets, seines, traps and other equipment are not fouled and are in working order. He may also have to mend or replace his lines or nets or repair or construct his traps. Such activities are an integral part of the operations of "catching" and "taking" fish and are exempt.

(2) The replacement, repair, mending or construction of the fisherman's equipment performed at the place of the fishing operation would be exempt. Such activities performed in contemplation of the trip are also within the exemption if the work is closely related both in point of time and causation to the acquisition of the aquatic life. For example, the repair of the nets, or of the vessel, or the building of fish trap frames on the shore immediately prior to the opening of the fishing season would be within the exemption. It is immaterial if such work is performed by the fisherman himself or by some other employee of the fishing organization. However, the exemption would not apply to employees of a manufacturer of supplies nor to employees of independent shops which repair boats and equipment.<sup>22</sup>

(b) *Going to and returning from work.* The phrase "including the going to and returning from work" relates to the preceding named operations which pertain to the procuring and appropriation of seafood and other forms of aquatic life from nature. The expression obviously includes the time spent by fishermen and others who go to and from the fishing grounds or other locations where the aquatic life is reduced to possession. In performing such travel the fishermen may be required to row, guide or sail the boat or otherwise assist in its operation. Similarly, if an employee were digging for clams or other shellfish or gathering seaweed on the sand or rocks it might be necessary to drive a truck or other vehicle to reach his destination. Such activities are exempt within the meaning

<sup>22</sup> *Dice v. Macdrix*, 144 F. 2d 584 (C.A. 4), affirmed 324 U.S. 697.

of this language. However, the phrase does not apply to employees who are not engaged in the acquisition of aquatic animal or vegetable life such as those going to or returning from work at processing or refrigerator plants, or wholesale establishments.

(c) *Trip employees who may be exempt under section 13(a) (14).* Section 13(a) (14) provides an exemption from the minimum wage and overtime provisions of the Act for "any employee employed as a seaman". This exemption applies to employees working aboard vessels whose services are rendered primarily as an aid in the operation of the vessel as a means of transportation. Typically, the exemption extends to members of the crew such as deckhands, sailors, engineers, repairmen, radio operators, firemen, pursers, surgeons, cooks, and stewards. For a further explanation of the seaman's exemption see part 783 of this chapter issued by the Department of Labor.<sup>23</sup>

#### § 784.9 Shore activities—"Loading, unloading, or packing of such products for shipment."

The phrase "loading, unloading, or packing of such products for shipment" applies to activities connected with the removal of aquatic products from the fishing vessels and their initial movement to markets or processing plants. Included are such activities as unloading the aquatic products from the vessels, placing the products on conveyors for movement into a processing plant or placing them into boxes, and loading the products on trucks or other transportation facilities for shipment.

#### § 784.10 Processing (other than canning), freezing, and curing.

(a) Processing (other than canning), freezing and curing embrace a variety of operations that change the form of the "aquatic forms of animal and vegetable life." They include such operations as filleting, cutting, scaling, salting, smoking, drying, pickling, curing, freezing, extracting oil, manufacturing meal or fertilizer, drying seaweed preparatory to the manufacture of agar, drying and cleaning sponges.<sup>24</sup>

(b) Such operations as transporting aquatic products to the processing plant; moving the products from place to place in the plant; cutting, trimming, eviscerating, peeling, shelling and otherwise working on the product; packing the product; and moving the products from the production line to storage or to the shipping platform are typical of the operations included in the exemption. Removal of waste, such as clam and oyster shells, and operation of processing and packing machinery are also included. As for the application of the exemption to office, maintenance, warehouse and other employees, see the discussion in § 784.7.

(c) As previously indicated in § 784.5, after the character of the aquatic products as taken from nature has been altered by the performance of the enumerated operations so as to render them nonperishable, e.g., drying and cleaning sponges, section 13(a) (5) provides no exemption for any subsequent operations on the preserved products, unless the subsequent operation is an integral part

<sup>23</sup> 29 CFR Part 783.

<sup>24</sup> *Pleming v. Hawkeye Pearl Button Co.*, 113 F. 2d 52 (C.A. 8).

of the exempt operations. The subsequent storing, marketing, or distributing of such preserved products (including products processed during previous weeks or seasons) by the employer who performed the exempt operations on them will be considered an integral part of those exempt operations in those weeks in which he is actively engaged in processing, freezing or curing.

(d) If, on the other hand, the aquatic products, though subjected to a processing operation, are still in a perishable state, the subsequent performance of any of the enumerated operations on the still perishable products will be within the exemption no matter who the employer performing the exempt operations may be. He may be the same employer who performed the prior processing or other exempt operations, another processor, or a wholesaler, as the case may be.

(e) The same would be true where the specified operations are performed on perishable byproducts. For example, fish-reduction operations performed on the inedible and still perishable portions of fish resulting from processing or canning operations, to produce fish oil or meal, would come within the exemption.<sup>25</sup> Subsequent operations on the oil to fortify it would not be exempt, however, since fish oil is nonperishable in the sense that it may be held for a substantial period of time without deterioration.

#### § 784.11 Fish and seafood wholesaling.

(a) Section 13(a) (5) provides exemption for employment in "marketing . . . storing, or distributing" the named aquatic products or byproducts. As applied to the wholesaling of fish and seafood, this provision affords exemption to such activities as unloading the aquatic product at the establishment, icing or refrigerating the product and storing it, placing the product into boxes, and loading the boxes on trucks or other transportation facilities for shipment to retailers or other receivers. Transportation to and from the establishment is also included.<sup>26</sup> Office and clerical employees of a wholesaler who perform general office work such as posting to ledgers, sending bills and statements, preparing tax returns and making up payrolls are not exempt. Such activities as selling, taking and putting up orders, recording sales, and taking cash are, however, within the exemption. See § 784.7 (a) in this connection.

(b) Employees of a wholesaler engaged in the performance of any of the enumerated operations on fresh fish or fish products will be engaged in exempt work. However, any such operations which they perform on aquatic products which have been canned or otherwise rendered nonperishable are nonexempt in accordance with the principles stated in § 784.5.

#### § 784.12 Processing or manufacturing operations which are not within the exemption.

(a) Since the subject matter of the exemption is concerned with "aquatic forms of animal and vegetable life", the courts have held that the manufacture of

<sup>25</sup> Any operation performed on such fish scraps, an unsegregated portion of which is to be canned, would come within section 13(b) (4) and not section 13(a) (5).

<sup>26</sup> *Johnson v. Johnson and Company, Inc.*, 47 F. Supp. 650 (N.D. Ga.).



buttons from clam shells or the dredging of shells to be made into lime and cement are not within the scope of the exemption because the shells are not living things." Similarly, the production of such items as crushed shell and grit, shell lime, pearl buttons, knife handles, novelties, liquid glue, isinglass, pearl-essence and fortified or refined fish oil is not within the section 13(a)(5) exemption.

(b) In addition, the exemption would not be applicable to the manufacture of boxes, barrels or ice by a seafood processor for packing or shipping its seafood products or for use of the ice in its fishing vessels. These operations, when performed by an independent manufacturer, would likewise not be exempt.<sup>13</sup>

#### § 784.13. Definition of canning under section 13(b)(4).

(a) Section 13(b)(4) provides an exemption from the overtime but not from the minimum wage provisions of the Act for "any employee employed in the canning of any kind of fish, shellfish, or other aquatic forms of animal or vegetable life, or any byproduct thereof." The enforcement policy set forth in § 784.5(d) with reference to the performance of the operations specified in section 13(a)(5) of the Act on frozen, smoked, salted or cured fish is also applicable to canning under section 13(b)(4).

(b) This section of the Act was adopted in 1949. Unlike section 13(a)(5) which specifies a number of exempt operations, section 13(b)(4) is concerned with only one; namely, "canning." The legislative history of this section explains the type of activities included in that term as follows:<sup>14</sup>

Under the conference agreement "canning" means hermetically sealing and sterilizing or pasteurizing and has reference to a process involving the performance of such operations. It also means other operations performed in connection therewith such as necessary preparatory operations performed on the products before they are placed in bottles, cans, or other containers to be hermetically sealed, as well as the actual placing of the commodities in such containers. Also included are subsequent operations such as the labeling of the cans or other containers and the placing of the sealed containers in cases or boxes whether such subsequent operations are performed as part of an uninterrupted or interrupted process. It does not include the placing of such products or byproducts thereof in cans or other containers that are not hermetically sealed as such an operation is "processing" as distinguished from "canning" and comes within the complete exemption contained in section 13(a)(5).

#### § 784.14. "Necessary preparatory operations".

(a) All necessary preparatory work performed on the exempt aquatic products as an integral part of a single uninterrupted canning process is subject to section 13(b)(4) and not to section 13(a)(5).<sup>15</sup> Such activities conducted as essential and integrated steps in the continuous and uninterrupted process of

canning are clearly within the definition of "canning" as contemplated by Congress and cannot be viewed in isolation from the canning process as a whole. Exempt preparatory operations include the necessary weighing, cleaning, picking, peeling, shucking, cutting, heating, cooling, steaming, mixing, cooking, carrying, conveying, and transferring to the containers the exempt aquatic products. But the preparatory operations do not include operations specified in section 13(a)(5) pertaining to the acquisition of the exempt products from nature. Therefore, if a canner employs fishermen or others to catch, take, harvest, cultivate or farm aquatic animal and vegetable life, section 13(a)(5) and not section 13(b)(4) would apply to those particular operations.

(b) The mere fact that operations preparatory to canning are physically separated from the main canning operations of hermetically sealing and sterilizing or pasteurizing would not be sufficient to remove them from the scope of section 13(b)(4). If the operations of separate processors are integrated in producing canned seafood products, all employees of such processors who perform any part of the described continuous series of operations to accomplish this result would be "employed in the canning of" such products. Where preparatory operations such as the steaming or shucking of oysters are performed in an establishment owned, operated, or controlled by a canner of seafood as part of a process consisting of a continuous series of operations in which such products are hermetically sealed in containers and sterilized or pasteurized, all employees who perform any part of such series of operations on any portion of such aquatic products for canning purposes are within the scope of the term "canning".

(c) Moreover, preliminary operations performed in a separately owned processing establishment which are directed toward the particular requirements of a cannery pursuant to some definite arrangement between the operators of the two establishments would generally appear to be integrated with the cannery operations within the meaning of the above principles, so that the employees engaged in the preliminary operations in the separate establishment would be employed in "canning" within the meaning of section 13(b)(4) of the Act. Whether or not integration exists in a specific case of this general nature will depend, of course, upon all the relevant facts and circumstances in such case.

(d) The cooling, icing, or refrigeration of the aquatic products in the course of canning does not constitute such a break or discontinuance of the process as to bring the preparatory operations within section 13(a)(5) instead of section 13(b)(4). If the purpose of the refrigeration is to prevent spoilage for a short period, such as over the weekend, or during the transfer or shipment of the prepared products, or directly prior to the opening of the canning season. On the other hand, the freezing of aquatic products to be stored for a protracted or indefinite period for future canning is too remote from the actual canning to be an integral part of that operation and therefore is not within section 13(b)(4) but within section 13(a)(5).

#### § 784.15. "Hermetically sealing and sterilizing or pasteurizing".

(a) As previously stated, under the conference agreement, "canning" means hermetically sealing and sterilizing or pasteurizing and a processing involving such operations would constitute canning within the meaning of section 13(b)(4).

(b) Where section 13(b)(4) and section 13(a)(5) operations are intermingled, the former and not the latter exemption applies.<sup>16</sup> Thus, where preparatory operations are performed on fish or seafood, some of which are to be canned and some of which are for processing (other than canning), all the necessary preparatory operations are exempt under section 13(b)(4) until that point in the operations where the commodity is channeled to accomplish the separate objectives, namely, canning or processing. Thereafter, the canning operations would be exempt under section 13(b)(4) and the processing (other than canning) operations would be exempt under section 13(a)(5). For example, all the preparatory activities in a roe canning plant such as any unloading of the fish, cutting off the heads and tails, cleaning and scaling leading up to, and including the extraction of the roe would come within section 13(b)(4), whereas the subsequent boning and filleting of the fish would come within section 13(a)(5), when none of the filleted fish is to be canned.

#### § 784.16. Subsequent operations.

Canning, within the meaning of the exemption, includes operations performed after hermetic sealing of the cans or other containers such as labeling of them and placing of them in cases or boxes, which are required to place the canned products in the form in which it will be sold or shipped by the canner. This is so whether or not such operations immediately follow the actual canning operation as a part of an uninterrupted process. Storing and shipping operations performed by the employees of the cannery in connection with its canned products, during weeks in which canning operations are going on, come within the exemption. The fact that such activities relate in part to products processed during previous weeks or seasons would not affect the application of the exemption, provided canning operations such as hermetic sealing and sterilizing, or labeling, are currently being carried on.

#### § 784.17. Exempt and nonexempt employees.

(a) Since canning is the only operation named in section 13(b)(4), only those employees whose activities are an integral part of that operation are within the exemption. Thus, employees engaged in placing the fish or seafood into the cans, or operating the machinery that seals the cans or the equipment that sterilizes the canned product are engaged in exempt activities. In addition, can loft workers, those engaged in removing and carrying supplies from the stock rooms for current use in canning operations,<sup>17</sup> and employees whose duty it is to reform cans, when canning operations are going on, for current use and not for the purpose of producing a reserve supply of cans which may be

<sup>13</sup> Fleming v. Hawkeye Pearl Button Co., 119 F. 2d 82 (C.A. 8); Walling v. W. D. Haden, 183 F. 2d 196 (C.A. 5).

<sup>14</sup> Dize v. Maddrix, 144 F. 2d 584 (C.A. 4), affirmed 324 U.S. 697.

<sup>15</sup> House (Conference) Report No. 1453, 81st Cong., 1st Session; 95 Cong. Rec. 14878, 14922-23.

<sup>16</sup> Mitchell v. Myrtle Grove Packing Company, 350 U.S. 891; Tobin v. Blue Channel Corporation, 196 F. 2d 245 (C.A. 4).

<sup>17</sup> See § 784.2(c).

used at a relatively remote time are engaged in exempt activities. Similarly, the repairing, oiling, or greasing during the active season of canning machinery or equipment currently used in the actual canning operations are exempt activities. The making of repairs in the production room such as to the floor around the canning machinery or equipment would also be deemed exempt activities where the repairs are essential to the continued canning operations or to prevent interruptions in the canning operations.

(b) On the other hand, office employees who make up and maintain employment, social security, payroll, and other records such as bills of lading, packing tickets, time cards, and books and ledgers, bus drivers who transport

workers to and from the cannery,<sup>22</sup> cooks, kitchen help and waiters who prepare and serve food to the cannery employees, nurses, laboratory workers developing new products, watchmen and general maintenance employees are not considered as being engaged in exempt work. The receiving, unloading, and storing of supplies such as salt, condiments, cleaning supplies, containers, etc., in the plant or warehouse for subsequent use in the canning operations would not be within the exemption. The delivery of these articles from stock to meet the daily needs of the canning operations would, however, be exempt work.

(c) It may be that employees are engaged in the same workweek in per-

forming exempt and nonexempt work. For example, a shop machinist engaged in making a new part to be used in the repair of a machine currently used in canning operations would be doing exempt work. If he also in the same week makes parts to be stocked for use in case of future breakdowns, this work, since it does not directly contribute to continuous operations, would be non-exempt work causing the loss of the exemption if such work occupied a substantial amount (for enforcement purposes, more than 20 percent) of the employee's worktime in that week.<sup>23</sup>

Signed at Washington, D.C., this 5th day of February 1959.

CLARENCE T. LUNDQUIST,  
Administrator.



## Treasury Department

### BUREAU OF CUSTOMS

#### GROUND FISH FILLET IMPORT TARIFF-RATE QUOTA FOR 1959:

The reduced-tariff-rate import quota on fresh and frozen groundfish (cod, haddock, hake, pollock, cusk, and ocean perch) fillets and steaks for calendar year 1959 is 36,919,874 pounds, the Bureau of Customs announced in the February 17 Federal Register. Divided into quarterly quotas this means that 9,229,968 pounds of groundfish fillets and steaks during each quarter of 1959 may be imported at the 1-7/8 cents-per-pound rate of duty, and any imports over the quarterly quota will be dutiable at the rate of 2½ cents a pound.

The reduced-rate import quota for 1959 is 2.9 percent more than the 1958 quota of 35,892,221 pounds. From 1951 to 1959 the

Table 1 - Reduced-Tariff-Rate Import Quota for Fresh and Frozen Groundfish Fillets, 1951-1959

1959	1958	1957	1956	1955	1954	1953	1952	1951
36.9	35.9	37.4	35.2	35.4	34.0	33.9	31.5	29.3

quantity of fresh and frozen groundfish fillets permitted to enter the United States at the reduced rate of duty of 1-7/8 cents a pound has increased 26 percent.

Average aggregate apparent annual consumption in the United States of fresh and frozen groundfish fillets and steaks (including the fillet blocks and slabs used in the manufacture of fish sticks, but excluding blocks of fish bits) for the three years (1956-1958) preceding 1959 was

246,132,491 pounds, calculated in accordance with the proviso to item 717(b) of Part I, Schedule XX, of the General Agreement on Tariffs and Trade (T. D. 51802). This was substantially greater than the con-

Table 2 - United States Aggregate Apparent Annual Consumption of Fresh and Frozen Groundfish Fillets and Steaks

3-Year Period	Quantity Million Lbs.
1956-58	246.1
1955-57	239.3
1954-56	249.2
1953-55	234.6
1952-54	236.2
1951-53	226.3

sumption of 239,281,473 pounds for 1955-57, but still not as high as the 249,170,004 pounds consumed in the three-year period of 1954-56.

Note: Also see *Commercial Fisheries Review*, April 1958, p. 80.



## Eighty-Sixth Congress

### (First Session)

Public bills and resolutions which may directly or indirectly affect the fisheries and allied industries are reported upon. Introduction, referral to committees, pertinent legislative actions, hearings, and other actions by the House and Senate, as well as signature into law or other final disposition are covered.



**CONSUMER EXPENDITURES STUDY BY FEDERAL TRADE COMMISSION:** H. R. 4420 (Zablocki), a bill to provide for a study and investigation of certain matters affecting the American consumer to be conducted by the Federal Trade Commission, and for other purposes; to the Committee on Interstate and Foreign Commerce; introduced in House February 11. Provides for a thorough study and investigation to determine portion of consumer expenditures attributed (1) to labor, materials, distribution, advertising, and other cost factors; (2) returns realized by producer, processor, distributor, and other persons; (3) relationship between prices, profits, and wages; (4) factors primarily responsible for inflation and deflation as affects U. S. economy; and (5) to determine if any measures are necessary to safeguard the position of the consumer.

**DOGFISH SHARK ERADICATION:** S. 1264 (Magnuson), a bill to amend the act providing for a program to eradicate the dogfish shark on the Pacific coast in order to expand such program; to the Committee on Interstate and Foreign Commerce; introduced in Senate March 5. The bill would amend the Act providing for a program to eradicate the dogfish shark on the Pacific Coast, approved September 2, 1958 (72 Stat. 1710), so as to extend the program from a "four year" to a "five year" period. The bill would also provide incentive payments to fishermen with respect to whole dogfish shark carcasses at rates not to exceed \$15 per ton and 15 cents per pound for dogfish shark livers. Such payments to be in addition to any amounts which domestic fishermen may obtain by selling such carcasses and livers.

**FROZEN FISH BITS TO BE CLASSIFIED UNDER FILLETS:** H. R. 4730 (O'Neill), a bill to make certain frozen fish blocks classifiable under paragraph 717 of the Tariff Act of 1930; to the Committee on Ways and Means; introduced in House February 18. Similar to H. R. 3883 and other bill previously introduced. Would classify blocks of frozen fish bits under the same category as fillets but at flat rate of duty of 2½ cents a pound.

**HAWAII STATEHOOD:** H. R. 4183 (Burns of Hawaii), a bill to provide for the admission of the State of Hawaii into the Union; also H. R. 4221 (O'Brien of New York), both introduced in House February 5, and H. R. 5440 (Fulton) introduced in House March 11; all to the Committee on Interior and Insular Affairs. Similar to H. R. 50 which was replaced by a clean bill—H. R. 4221. H. R. 4221 with amendment (H. Rept. No. 32) was favorably reported out by Committee on Interior and Insular Affairs on February 11 and referred to the Committee of the Whole House on the State of the Union.

Subcommittee on Territories and Insular Affairs of the Senate Committee on Interior and Insular Affairs on February 25 held and concluded hearings and ordered favorably reported to the full committee with amendments S. 50, to provide for the admission of Hawaii into the Union. The Senate Committee on Interior and Insular Affairs on March 3 unanimously ordered favorably reported with amendments S. 50 and on March 5 submitted the bill to the Senate with a favorable report (S. Rept. 80).

The Senate on March 11, by a vote of 76 to 15 passed S. 50, to provide for the admission of Ha-

wai into the Union, after adopting committee amendments en bloc and a series of technical amendments.

The House on March 12 agreed to consider Senate bill S. 50, under provisions of H. Res. 205, in lieu of H. R. 4221, and by a vote of 323 to 89 passed without amendment S. 50 to provide for the admission of the State of Hawaii into the Union. This cleared the bill for the White House.

House Report No. 32, Hawaii Statehood (February 11, 1959, 86th Congress, 1st Session, Report of the House Committee on Interior and Insular Affairs to accompany H. R. 4221), 70 pp., printed. Contains legislative history, major provisions of the bill, geography, demography, economy, highlights of business activities and commerce, reasons and readiness for statehood, arguments for and against statehood, sectional analysis of the bill, and Executive Department reports supporting statehood. The appendix contains the Constitution for the State of Hawaii, indexes of congressional investigations and House and Senate hearings and reports on Hawaii statehood, resolution which provided for annexation of the Hawaiian Islands to the United States, and changes in existing laws.

Senate Report No. 80, Statehood For Hawaii (March 5, 1959, 86th Congress, 1st Session, Report of the Senate Committee on Interior and Insular Affairs to accompany S. 50), 76 pp., printed. Contains major provisions of the bill, committee amendments, background of legislation, basic physical facts regarding geography and population, reasons and readiness for statehood, arguments against statehood, sectional analysis of the bill, executive agency reports, and changes in existing law. The appendix contains the constitution for the State of Hawaii, index of congressional investigations made since 1935 on statehood for Hawaii, listing of printed volumes of House and Senate Hearings and reports since 1933 on Hawaii Statehood, copy of resolution which provided for annexation of the Hawaiian Islands to the United States, and certain memoranda prepared by the Department of Interior regarding economic regulations over surface transportation, and application of the Commerce Clause of the Federal Constitution to Interisland Transactions in Hawaii.

**IMPORTED COMMODITY LABELING:** H. R. 5054 (Herlong), a bill to amend the Tariff Act of 1930 with respect to the marking of imported articles and containers; to the Committee on Ways and Means; introduced in House February 26. Similar to H. R. 2554 previously introduced.

**IMPORTS OF POLLUTED SHELLFISH PROHIBITED:** S. 1127 (Eastland), a bill to prohibit the importation into the United States of polluted shellfish; to the Committee on Finance; introduced in Senate February 19. Similar to H. R. 1244, previously introduced.

**INTERIOR SUPPLEMENTAL APPROPRIATIONS:** House Document No. 90, Proposed Supplemental Appropriations for the Legislative Branch, the Judiciary, the District of Columbia, and various Departments and Agencies of the Executive Branch of the Government, Fiscal Year 1959 (March 2, 1959, 86th Congress, 1st Session, 18 pp.), printed. A communication from the President of the United States to the House of Representatives transmitting

requests by the various Federal Agencies for additional funds for fiscal year 1959 to meet increased pay costs authorized by law in 1958. Included under the Department of Interior are increases for the Fish and Wildlife Service and its two Bureaus.

**MARINE GAME FISH RESEARCH:** H. R. 5004 (Lennon), a bill authorizing and directing the Secretary of the Interior to undertake continuing research on the biology, fluctuations, status, and statistics of the migratory marine species of game fish of the United States and contiguous waters; to the Committee on Merchant Marine and Fisheries; introduced in House February 25.

**MARINE RESEARCH LABORATORY FOR SEATTLE AREA:** H. R. 4402 (Pelly), a bill to provide for the construction of a salt-water research laboratory at Seattle, Wash., to the Committee on Interior and Insular Affairs; introduced in House February 11; referred to Committee on Merchant Marine and Fisheries February 16. The bill would provide for the construction and equipping of a laboratory for the purpose of conducting research on marine life. The proposed laboratory will be built in conjunction with an aquarium to be built by the city of Seattle. Such laboratory will be operated jointly by the State of Washington Department of Fisheries, the University of Washington College of Fisheries and School of Oceanography, and the Fish and Wildlife Service, U. S. Department of the Interior.

**MEDICAL CARE FOR VESSEL PERSONNEL:** H. R. 4868 (Pelly), a bill to provide medical care for certain persons engaged on board a vessel with care, preservation, or navigation of such vessel; to the Committee on Interstate and Foreign Commerce; introduced in House February 23. Similar to S. 255 previously introduced.

**OCEANOGRAPHIC RESEARCH:** The House Committee on Merchant Marine and Fisheries has set up a Subcommittee on Oceanography and on March 3, 1959, was still receiving testimony and conducting hearings on the need of extensive oceanographic research.

**PRICE DISCRIMINATION:** S. 138 (Capehart), a bill to define the application of the Clayton and Federal Trade Commission Acts to certain pricing practices; to the Committee on the Judiciary; introduced in Senate January 9. Similar to H. R. 11 and other bills previously introduced.

Subcommittee on Antitrust and Monopoly of Senate Committee on the Judiciary planned to begin hearings on S. 11 and S. 138 on March 17, 1959.

**PRICE DISCRIMINATION ENFORCEMENT OF ORDERS:** The Senate Committee on the Judiciary concluded hearings on March 2 and favorably reported out S. 726, a bill to amend section 11 of the Clayton Act so as to provide for the more expeditious enforcement of cease and desist orders issued thereunder (with amendments); the Committee reported the bill favorably to the Senate on March 5 (S. Rept. 83).

Senate Report No. 83, Making Clayton Act Orders Final (March 5, 1959, 86th Congress, 1st Session, Report of the Senate Committee on the Judiciary together with individual views to accompany S. 726, 11 pp.), printed. The report contains

testimony presented by Federal Agencies related to the purpose of the bill, technical amendments, and changes in existing law.

**PRICE DISCRIMINATION ACTIONS FOR DAMAGES FOR VIOLATIONS:** H. R. 4350 (Cunningham), a bill to amend the Clayton Act so as to supplement existing laws against unlawful restraints and monopolies by providing that violations of the Robinson-Patman Act shall constitute violations of the antitrust laws; to the Committee on the Judiciary; introduced in House February 11. Similar to H. R. 212 and other bills previously introduced.

**PRICE DISCRIMINATION FUNCTIONAL DISCOUNTS:** H. R. 4530 (Reuss), a bill to reaffirm the national public policy and the purposes of Congress in enacting the Robinson-Patman Antiprice Discrimination Act entitled "An act to amend section 2 of the act entitled 'An Act to supplement existing laws against unlawful restraints and monopolies, and for other purposes,' approved October 15, 1914, as amended (U. S. C., title 15, sec. 13), and for other purposes," and to clarify the intent and meaning of the aforesaid law by providing for the mandatory nature of functional discounts under certain circumstances; to the Committee on the Judiciary; introduced in House February 16. Similar to H. R. 848 and other bills previously introduced.

**RIGHTS OF U. S. VESSELS ON THE HIGH SEAS:** S. 971 (Magnuson), a bill to amend the act of August 27, 1954 (68 Stat. 883) relating to the rights of vessels of the United States on the high seas, and in the territorial waters of foreign countries; to the Committee on Interstate and Foreign Commerce; introduced in Senate February 6. The bill provides that, in addition to the amount of any fines imposed, owners of seized U. S. vessels would be reimbursed for any losses, including reasonable expenses, of fishing gear, equipment, and catch. Crew members, who are U. S. citizens, would be reimbursed for expenses and losses which might be incurred from injuries sustained as a direct result of vessel seizure and in the event of death of any such crew member from such injuries, the bill provides for payment of the sum of \$10,000 to the surviving wife or minor children. The Secretary of State shall take actions necessary to collect on claims against a foreign country for amounts expended because of seizure of a U. S. vessel and shall make a report to the Congress annually as to the status of such claims.

**SALMON IMPORT RESTRICTIONS:** H. R. 4293 (Pelly), a bill to facilitate the application and operation of the Fish and Wildlife Act of 1956, and for other purposes; to the Committee on Merchant Marine and Fisheries; introduced in House February 9. Similar to H. R. 605 and other bills previously introduced designed to protect and preserve our salmon fishery resources by discouraging nationals of other countries from indiscriminate and uncontrolled net fishing not in compliance with the International Convention for the High Seas Fisheries of the North Pacific Ocean. The new bill, introduced as a revision of H. R. 605, retains restrictions which would prohibit the importation of salmon products derived from fish caught by nationals of any country that permits fishing for salmon by gill nets on the high seas at times and places where occur large quantities of immature



salmon of North American origin. The bill also includes a new provision to make the law inoperative if the fishing activities of foreign nationals are deemed not to be adversely affecting conservation of our salmon runs.

House Joint Memorial of the Legislative Assembly of the State of Oregon was presented to the Senate by Senator Neuberger and to the House by Congressman Green on March 2. The Memorial urges the President of the United States to complete a treaty with Japan and other nations on maximum salmon fishing in the north Pacific Ocean; Memorial to the Senate was referred to Committee on Foreign Relations.

**SMALL BUSINESS CONCERN DEFINITION:** H. R. 4171 (Michel), a bill to amend section 3 of the Small Business Act with respect to the definition of "small business concern;" to the Committee on Banking and Currency; introduced in House February 5.

**Definition of "Small Business" within meaning of Small Business Act of 1953,** as amended (Hearings before Subcommittee No. 2 of the Select Committee on Small Business, House of Representatives, 85th Congress, 2nd Session, May 27, June 3, 4, 10, 17, 18, and 25, 1958), 305 pp., printed. Reports in detail testimony presented by Government Agencies and various firms specifically on the definition of "Small Business."

**SMALL BUSINESS INVESTMENT ACT OF 1958 AMENDMENT:** S. 979 (Sparkman), a bill to amend the Internal Revenue Code of 1954 so as to provide further incentive for assistance to small business concerns by small business investment companies operating under the Small Business Investment Act of 1958; to Committee on Finance; introduced in Senate February 6. The proposed legislation is designed to eliminate certain tax pitfalls that tend to discourage investments in new companies. The bill would provide that small business investment companies would be exempt from the imposition of the accumulations surtax on earnings and profits when they keep their funds invested. Small business investment companies would be extended tax benefits covering straight loans which would allow a 15 percent tax deduction on interest income under the proposed amendment.

Also H. R. 4406 (Roosevelt) introduced in House February 11; and H. R. 4720 (Lane) introduced in House February 18; both to Committee on Ways and Means. Similar to S. 979 previously introduced.

**SMALL BUSINESS TAX RELIEF:** H. R. 4794 (Cunningham), a bill to provide a program of tax relief for small business and for persons engaged in small business; introduced in House February 19; also H. R. 5005 (McIntire) introduced in House February 25; both to Committee on Ways and Means. Similar to H. R. 2 and other bills previously introduced.

**SHRIMP CONSERVATION CONVENTION WITH CUBA:** The convention between the United States of America and Cuba for the conservation of shrimp, signed at Habana, Cuba, on August 15, 1958, was transmitted on March 5, 1959, to the Senate by the President of the United States for ratification together with a report of the Acting Secretary of State; referred to the Committee on Foreign Relations.

**STARFISH ERADICATION IN LONG ISLAND SOUND:** H. R. 5119 (Gialmo), a bill to provide that the Secretary of the Interior shall develop and carry out an emergency program for the eradication of starfish in Long Island Sound and adjacent waters; introduced in House March 2; also H. R. 5271 (Kowalski) introduced in House March 4; both to Committee on Merchant Marine and Fisheries. Similar to H. R. 1984 and other bills previously introduced.

**TRADE AGREEMENTS ADJUSTMENT ACT OF 1959:** H. R. 4846 (Bailey), a bill to regulate the foreign commerce of the United States by amending section 350 of the Tariff Act of 1930, as amended, and for other purposes; introduced in House February 23. The bill is designed to meet the problem of import competition faced by American industry and agriculture and remove the fear of injury that now exists under foreign trade policy. The provisions of the bill would make possible the limitation and containment of injury without a drastic reduction of imports. This would be accomplished through tariff adjustments or use of import quotas and would leave control over trade to the U. S. Tariff Commission. The powers of the President in rejecting commission recommendations in escape clause actions are redefined. In addition, provision is made in the bill for compensating other countries for withdrawal of concessions under special conditions.

Also H. R. 4918 (Davis of Georgia), H. R. 4919 (Dent), H. R. 4931 (Lane), H. R. 4937 (Mack of Washington), H. R. 4940 (Moore), and H. R. 4950 (Thomson of Wyoming), all introduced in House February 24; H. R. 5087 (Saylor) introduced in House February 26; H. R. 5121 (Huddleston) and H. R. 5130 (Oliver) introduced in House March 2; and H. R. 5215 (Smith of Kansas), H. R. 5221 (Withrow) introduced in House March 3; all to the Committee on Ways and Means. Similar to H. R. 4846 and other bills previously introduced which provide for meeting import competition.

**UNEMPLOYMENT RELIEF IN DEPRESSED AREAS:** H. R. 4172 (Moore), a bill to assist areas to develop and maintain stable and diversified economies by a program of financial and technical assistance and otherwise, and for other purposes; introduced in House February 5.

Also H. R. 4253 (Byrne of Pennsylvania), H. R. 4259 (Conte), H. R. 4264 (Fenton), and H. R. 4278 (Kilburn), all introduced in House February 8; S. 1064 (Dirksen) introduced in Senate February 16; H. R. 4616 (Green of Pennsylvania), introduced in House February 17; H. R. 4878 (Van Zandt) introduced in House February 23; H. R. 4897 (Adanizio) and H. R. 4907 (Bennett of Michigan) both introduced in House February 24; H. R. 4996 (Foley) introduced in House February 25; H. R. 5065 (Perkins) introduced in House February 26; H. R. 5107 (Elliott) introduced in House March 2; H. R. 5173 (Diggs) introduced in House March 3; H. R. 5275 (Nix) introduced in House March 4; H. R. 5318 (Morgan) and H. R. 5330 (Toll) both introduced in House March 5. All to the Committee on Banking and Currency. Similar to H. R. 71 and other bills previously introduced.

A draft of proposed legislation to assist areas to develop and maintain stable and diversified

economies by a program of financial and technical assistance and otherwise, and for other purposes was transmitted with an accompanying paper from the Secretary of Commerce; to the Committee on Banking and Currency on February 6.

The subcommittee on Production and Stabilization of the Senate Committee on Banking and Currency on February 25 began hearings on pending area redevelopment legislation (S. 268, 722, and 1064).

House Committee on Banking and Currency subcommittee No. 3 began hearings March 9 on H. R. 3505 and related bills providing for economic assistance and unemployment relief to depressed areas.

**WAGES:** H. R. 5171 (Diggs), a bill to amend the Fair Labor Standards Act of 1938 so as to increase the minimum hourly wage from \$1 to \$1.25; to the Committee on Education and Labor; introduced in House March 3; also H. R. 5339 (Halpern) introduced in House March 5; both to the Committee on Education and Labor. Similar to H. R. 83 and other bills previously introduced to amend the Fair Labor Standards Act of 1938, as amended, solely to increase the minimum hourly wage.

H. R. 4409 (Teller), a bill to amend the Fair Labor Standards Act of 1938, as amended, to provide coverage for employees of large enterprises engaged in retail trade or service and other employers engaged in activities affecting commerce, to increase the minimum wage under the act to \$1.25 an hour, and for other purposes; introduced in House February 11. Also H. R. 4488 (Roosevelt) and H. R. 4544 (Wier) introduced in House and S. 1046 (Kennedy & 6 other Senators) introduced in Senate February 16; H. R. 4579 (Dent) and H. R. 4664 (Zelenko) introduced in House February 17; and H. R. 4740 (Rodino) introduced in House February 18; House bills to the Committee on Education and Labor, Senate bill to Committee on Labor and Public Welfare. Similar to H. R. 188 and other bills previously introduced to amend the Fair Labor Standards Act of 1938, as amended, to provide coverage for employees of employers who

are engaged in activities affecting interstate commerce; to provide for review of industry committee recommendations by the Secretary of Labor; to increase the minimum wage rates; to eliminate certain exemptions; and for other purposes. The bill retains provisions which would continue to exempt any employee employed in the catching, taking, harvesting, cultivating, or farming of any kind of fish, shellfish, crustacea, sponges, seaweeds, or other aquatic forms of animal life, including the going to and returning from work and loading and unloading when performed by any such employee.

S. 1116 (Goldwater), a bill to amend the Fair Labor Standards Act of 1938, as amended, to provide for review by the Secretary of Labor of the minimum wage recommendations of industry committees; to the Committee on Labor and Public Welfare; introduced in Senate February 19. Similar to H. R. 3865, previously introduced. The bill would restore certain provisions, abolished by the 1955 amendments to the Fair Labor Standards Act, to provide for a review by the Secretary of Labor of the wage rate recommendations of the tripartite industry committees in Puerto Rico and the Virgin Islands. The proposal is designed to carry out a recommendation made by the President when he signed the enrolled enactment of the American Samoa Labor Standards Amendments of 1956. The amendment would also require that the Secretary of Labor prescribe by rules and regulations the procedures to be followed for the orderly review of the minimum wage determinations of the industry committees.

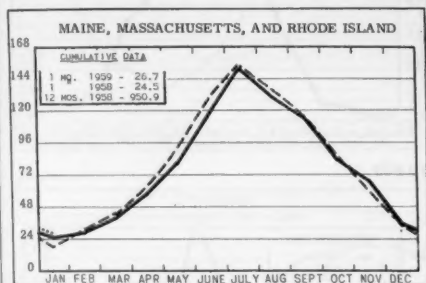
H. R. 2435 (Libonati) as previously reported in February 1959 issue of *Commercial Fisheries Review* should have read H. R. 2345 (Libonati). H. R. 317 (Addonizio) previously listed under FAIR LABOR STANDARDS AMENDMENTS OF 1959, is now listed under WAGES.

H. R. 188 (Lane), and H. R. 253 (Rooney), H. R. 450 (Zelenko), H. R. 1198 (Wier), and H. R. 2345 (Libonati) previously reported as similar to H. R. 83, are really the same as H. R. 188 which contains provisions other than solely to increase the minimum wage rate.

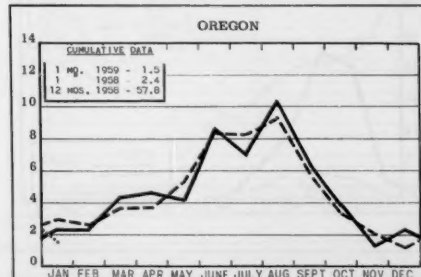
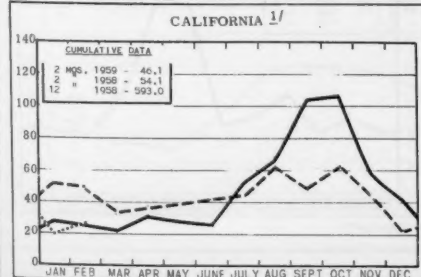
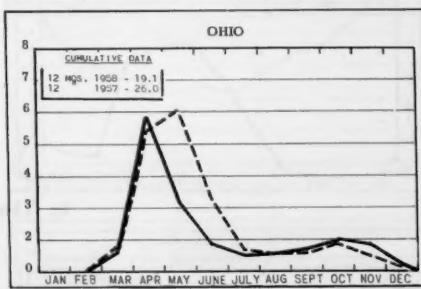
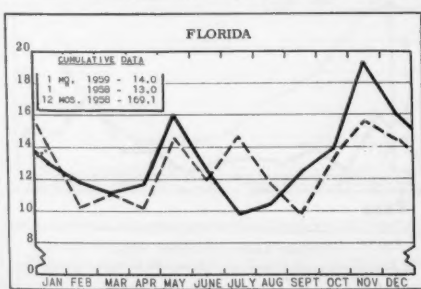
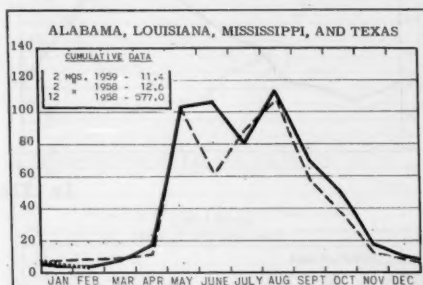
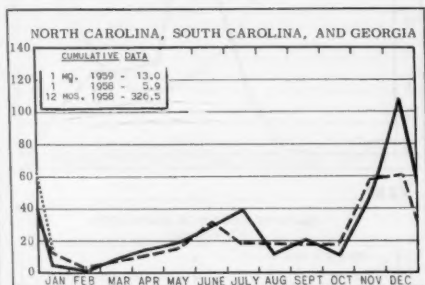
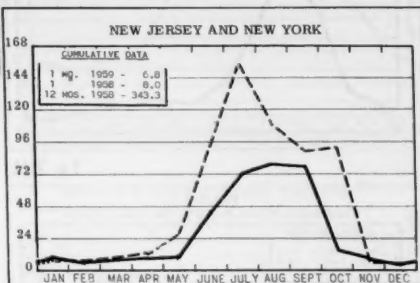


# FISHERY INDICATORS

CHART 1 - FISHERY LANDINGS for SELECTED STATES  
In Millions of Pounds



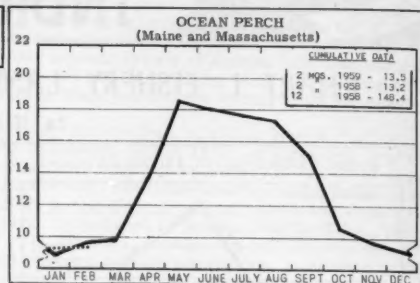
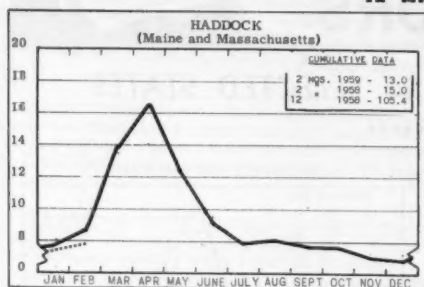
LEGEND:  
..... 1959  
———— 1958  
- - - - 1957



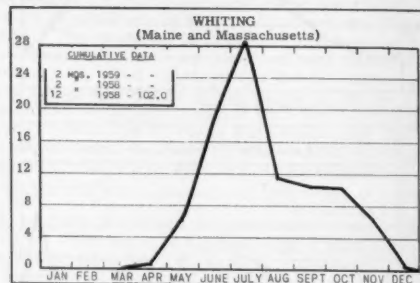
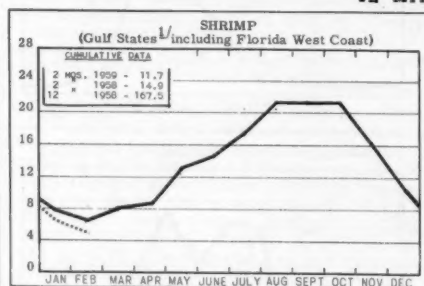
1/ONLY PARTIAL--INCLUDING PRODUCTION OF MAJOR FISHERIES AND MARKET FISH LANDINGS AT PRINCIPAL PORTS.

## CHART 2 - LANDINGS for SELECTED FISHERIES

In Millions of Pounds

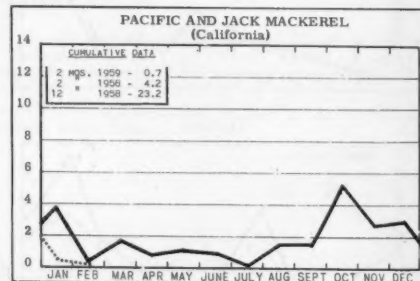
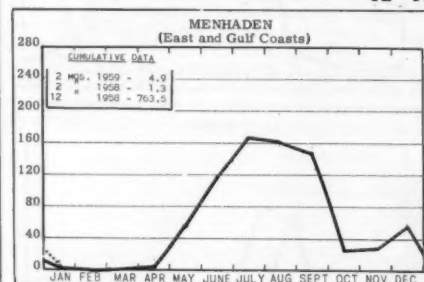


In Millions of Pounds

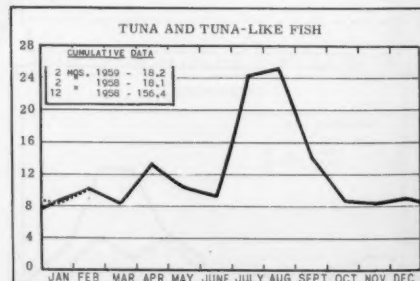
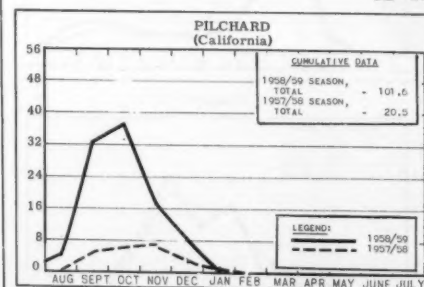


<sup>1/</sup>LA. & ALA. DATA BASED ON LANDINGS AT PRINCIPAL PORTS AND ARE NOT COMPLETE.

In Thousands of Tons



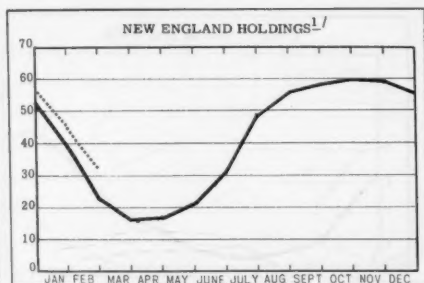
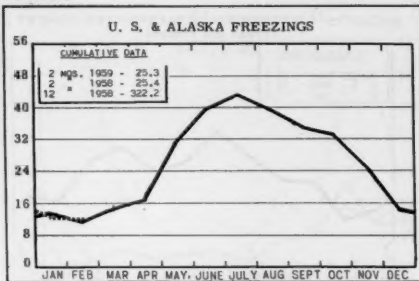
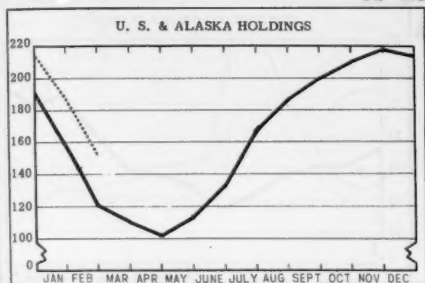
In Thousands of Tons



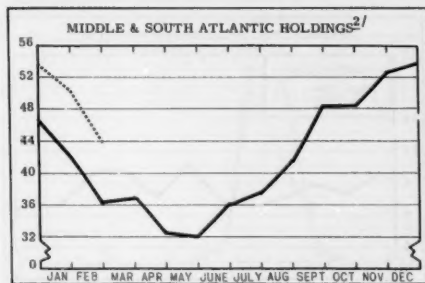


# CHART 3 - COLD-STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS \*

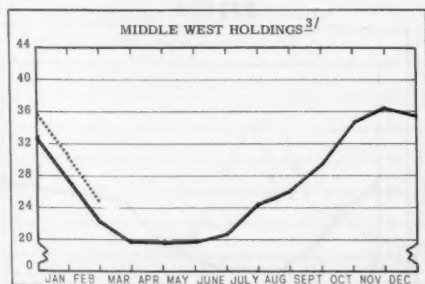
In Millions of Pounds



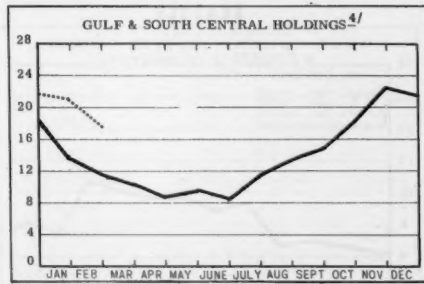
<sup>1/</sup>MAINE, MASSACHUSETTS, RHODE ISLAND, AND CONNECTICUT.



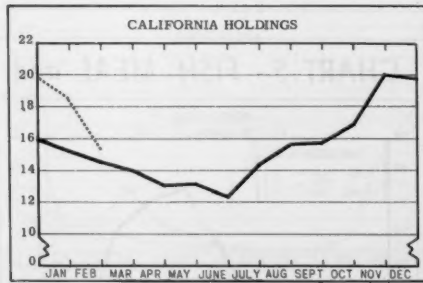
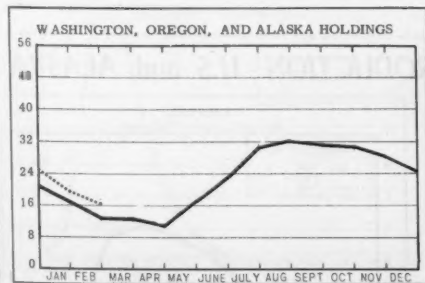
<sup>2/</sup>ALL EAST COAST STATES FROM N.Y. SOUTH.



<sup>3/</sup>OHIO, IND., ILL., MICH., WIS., MINN., IOWA, MO., N. DAK., NEBR., & KANS.



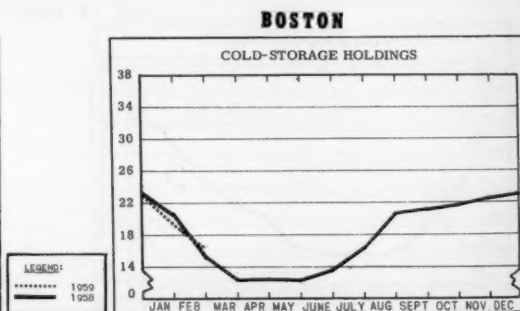
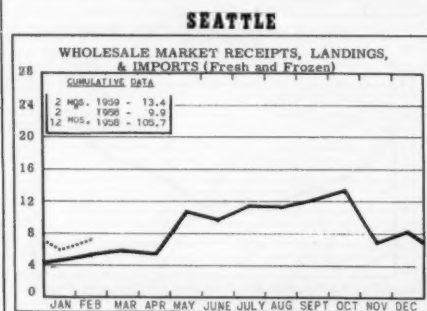
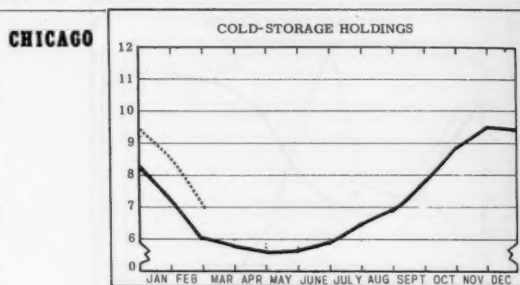
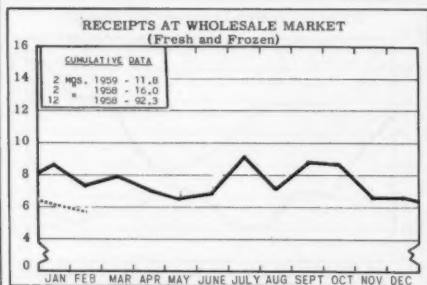
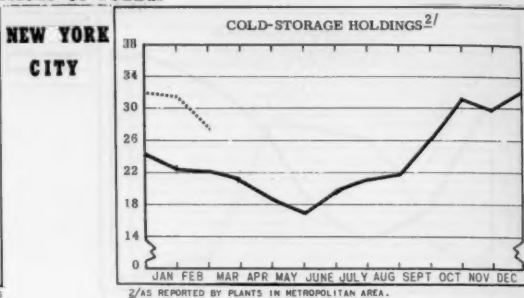
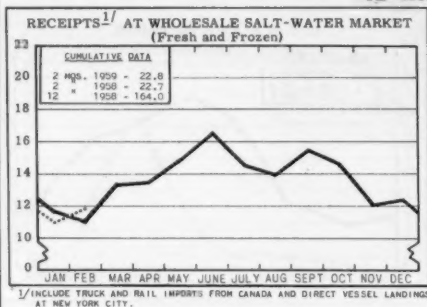
<sup>4/</sup>ALA., MISS., LA., TEX., ARK., KY., & TENN.



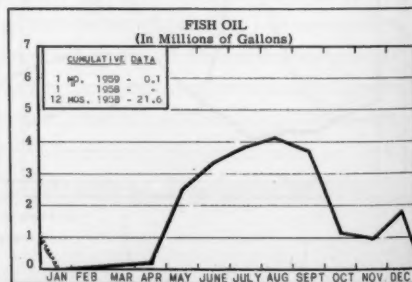
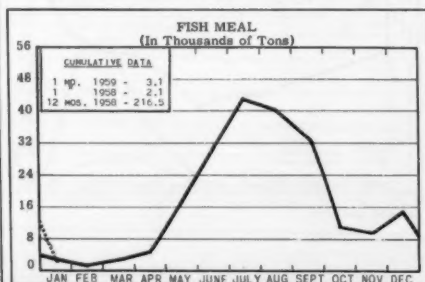
\* Excludes salted, cured, and smoked products.

# **CHART 4 - RECEIPTS and COLD-STORAGE HOLDINGS of FISHERY PRODUCTS at PRINCIPAL DISTRIBUTION CENTERS**

In Millions of Pounds

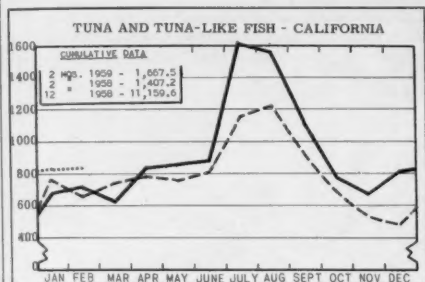


## **CHART 5 - FISH MEAL and OIL PRODUCTION - U.S. and ALASKA**

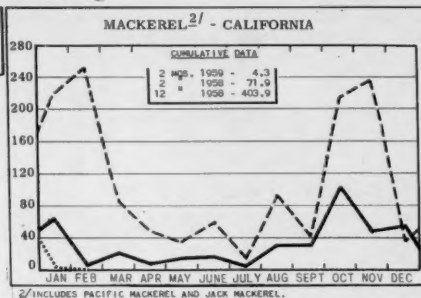


# CHART 6 - CANNED PACKS of SELECTED FISHERY PRODUCTS

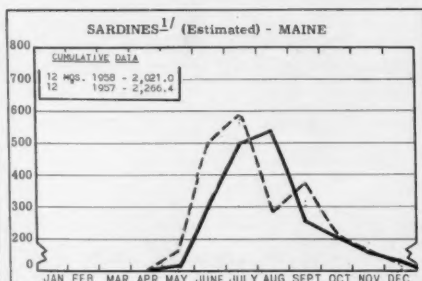
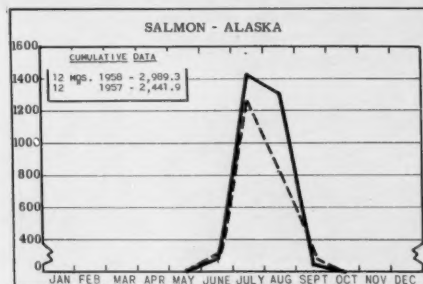
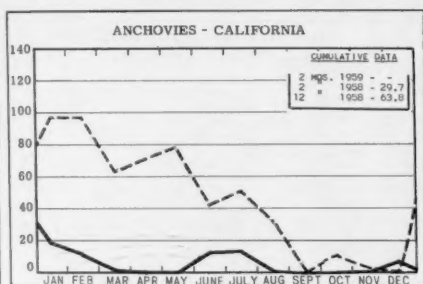
In Thousands of Standard Cases



LEGEND:  
..... 1959  
———— 1958  
----- 1957

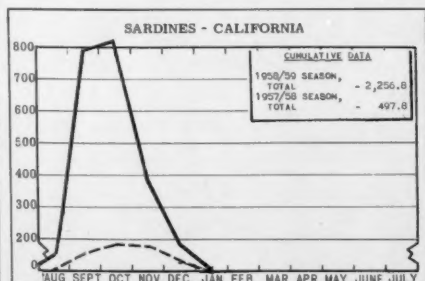


<sup>2/</sup>INCLUDES PACIFIC MACKEREL AND JACK MACKEREL.

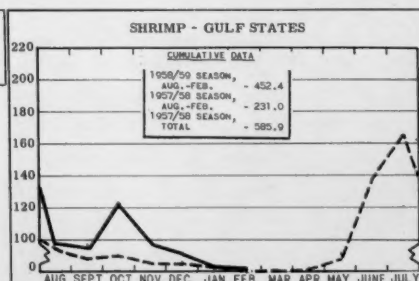


## STANDARD CASES

Variety	No. Cans	Designation	Net Wgt.
SARDINES.....	100	$\frac{1}{4}$ drawn	3 $\frac{1}{2}$ oz.
SHRIMP.....	48	--	5 oz.
TUNA.....	48	# $\frac{1}{2}$ tuna	6 & 7 oz.
PILCHARDS...	48	# 1 oval	15 oz.
SALMON.....	48	1-lb. tall	16 oz.
ANCHOVIES...	48	$\frac{1}{2}$ -lb.	8 oz.

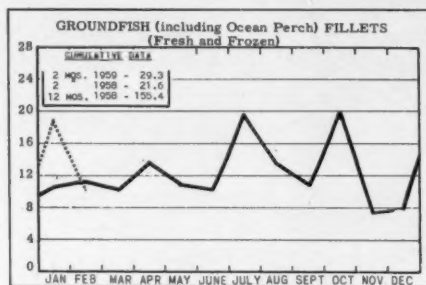


Legend:  
———— 1958/59  
----- 1957/58

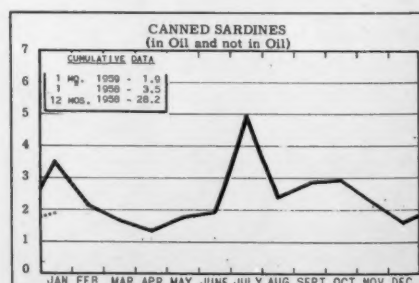
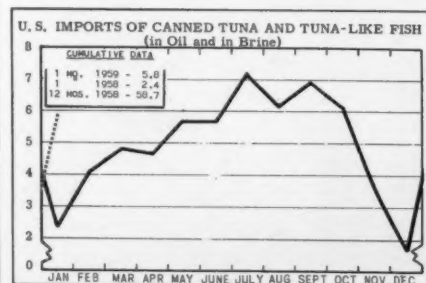
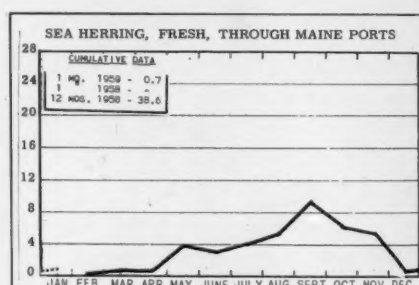
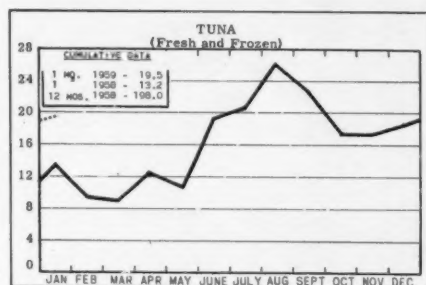
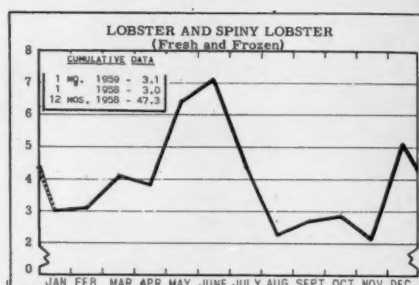
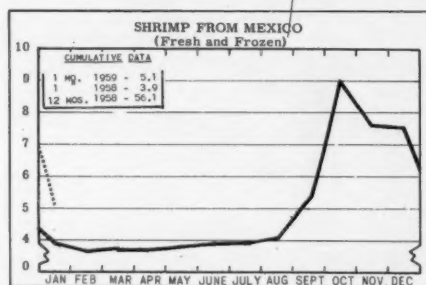
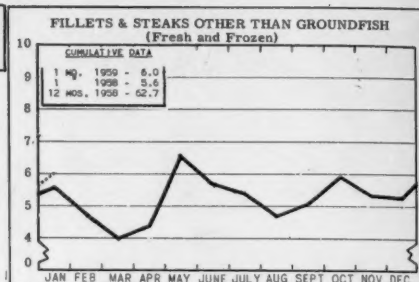


# CHART 7 - U.S. FISHERY PRODUCTS IMPORTS

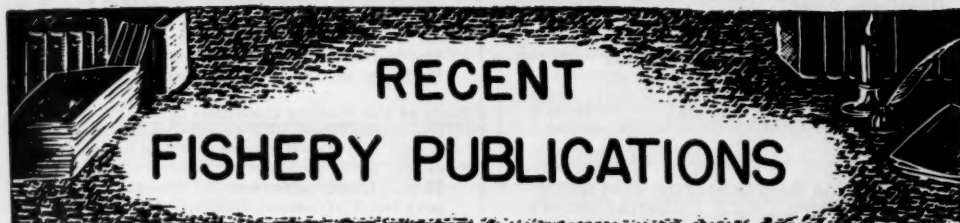
In Millions of Pounds



LEGEND:  
..... 1959  
———— 1958







# RECENT FISHERY PUBLICATIONS

## FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE DIVISION OF INFORMATION, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON 25, D. C. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

- CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES AND ALASKA.  
FL - FISHERY LEAFLETS.  
SSR-FISH-SPECIAL SCIENTIFIC REPORTS--FISHERIES (LIMITED DISTRIBUTION).  
SEP. - SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.

- | Number            | Title  |
|-------------------|--|
| CFS-1944          | - Frozen Fish Report, November 1958, 8 pp.   |
| CFS-1946          | - North Carolina Landings, November 1958, 3 pp.  |
| CFS-1950          | - Frozen Fish Report, December 1958, 8 pp.   |
| CFS-1951          | - Fish Meal and Oil, November 1958, 2 pp.  |
| CFS-1953          | - Mississippi Landings, October 1958, 2 pp.  |
| CFS-1957          | - Texas Landings, October 1958, 3 pp.  |
| CFS-1958          | - Maine Landings, November 1958, 3 pp.   |
| CFS-1960          | - Florida Landings, November 1958, 7 pp.   |
| CFS-1963          | - Massachusetts Landings, September 1958, 5 pp.  |
| CFS-1964          | - Alabama Landings, October 1958, 2 pp.  |
| CFS-1965          | - New Jersey Landings, November 1958, 3 pp.  |
| CFS-1967          | - South Carolina Landings, December 1958, 2 pp.  |
| CFS-1980          | - Florida Landings, December 1958, 7 pp.   |
| CFS-1981          | - Manufactured Fishery Products, 1957 Annual Summary, 7 pp.  |
| CFS-1984          | - Fisheries of the United States and Alaska, 1957 Annual Summary, 13 pp.   |
| FL-9              | - Available Leaflets on Fisheries--1958, 16 pp., revised November 1958.  |
| FL-476c           | - Canned Fish Retail Prices, December 1958, 27 pp.   |
| SSR-Fish, No. 260 | - Nutritive Value of Pollock Fish Scales as Determined by Rat Feeding Tests, by Donald G. Snyder and Hugh W. Nilson, 17 pp., illus., 1958.   |
| SSR-Fish, No. 277 | - Survey of the United States Shrimp Industry, Volume I, 322 pp., illus., November 1958. This report published in two volumes provides a comprehensive examination of the shrimp grounds, vessel construction, |

fishing operations, fishing costs, processing plant efficiency, processing costs, trends in distribution, packaging, storing, shipping, per capita consumption, prices, wholesaling, retailing, merchandising, and consumer preferences. Volume I contains the first five chapters which deal with production and processing. Volume II contains the last four chapters, three of which deal with marketing. The last chapter contains a summary of conclusions and recommendations, which finds that the shrimp industry's welfare can be safeguarded best (1) by increasing the efficiency of operations at all levels and thus effecting cost savings in shrimp production, processing and distribution and (2) by stabilizing markets. Specific suggestions to improve current practices are made throughout. For example, the chapter on processing contains the results of engineering surveys which provide plans for model layouts for freezing and bread-ing plants and canneries. An economic analysis is made of the problems of marketing and price stability.

SSR-Fish, No. 280 - Applications of Salt in Electrofishing, by Robert E. Lennon and Phillip S. Parker, 16 pp., illus., November 1958.

SSR-Fish, No. 281 - Water Soluble Vitamin Requirements of Silver Salmon, by John A. Coates and John E. Halver, 14 pp., November 1958.

Sep. No. 542 - Ascorbic Acid as an Antioxidant for Frozen Oysters and Effect of Copper-Chelating Ability of Oyster Tissue on Ascorbic Acid Oxidation.

Sep. No. 543 - King Crab, Shrimp, and Bottom Fish Explorations from Shumagin Islands to Unalaska, Alaska - Summer and Fall, 1957.

Sep. No. 544 - Research in Service Laboratories (March 1959): Technical Note No. 51 - Use of Corn-Sirup Solids in Packaging and Freezing Fish.

THE FOLLOWING SERVICE PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED.

Annual Report of the U. S. Fish and Wildlife Service, Bureau of Commercial Fisheries, Bureau of Sport Fisheries and Wildlife, for the Fiscal Year 1957, 32 pp., illus., printed. (Reprinted from the Annual Report of the Secretary of the Interior, for the Fiscal Year ended June 30, 1957.) Summarizes the various activities of the Service. Specifically discusses the commercial fisheries (describes the activities of the Bureau of Commercial Fisheries); research in fishery biology (coastal, inland, and marine

fisheries); conservation of Alaska commercial fisheries; Pribilof Islands fur-seal industry; foreign activities; maintenance of inland fisheries; Federal aid to the States for the restoration of fish and wildlife; and river basin studies. Other activities of the Bureau of Sport Fisheries and Wildlife are also included.

California Fishery Products Monthly Summary, December 1958, 16 pp. (Market News Service, U. S. Fish and Wildlife Service, Post Office Bldg., San Pedro, Calif.) California cannery receipts of tuna and tunalike fish and sardines; pack of canned tuna, mackerel, anchovies, and sardines; market fish receipts at San Pedro, Santa Monica, San Diego, and Eureka areas; California imports; canned fish and frozen shrimp prices; ex-vessel prices for cannery fish; American Tuna Boat Association auction sales; for the month indicated.

(Chicago) Monthly Summary of Chicago's Fresh and Frozen Fishery Products Receipts and Wholesale Market Prices, December 1958, 14 pp. (Market News Service, U. S. Fish and Wildlife Service, 565 W. Washington St., Chicago 6, Ill.) Receipts at Chicago by species and by states and provinces for fresh- and salt-water fish and shellfish; and wholesale prices for fresh and frozen fishery products; for the month indicated. Also reviews 1958 trends.

Fish in the Sodium-Restricted Diet, by Kathryn L. Osterhaug, 2 pp., printed. (Reprinted from Pacific Fisherman, October 1958.) Fishery Technological Laboratory, Bureau of Commercial Fisheries, U. S. Fish and Wildlife Service, Seattle, Wash.

(Gulf) Brokers and Importers of Fishery Products, New Orleans, La., 1958, 3 pp. (Market News Service, U. S. Fish and Wildlife Service, 609-611 Federal Bldg., New Orleans 12, La.)

Monthly Summary of Fishery Products Production in Selected Areas of Virginia, North Carolina, and Maryland, January 1959, 4 pp. (Market News Service, U. S. Fish and Wildlife Service, 18 So. King St., Hampton, Va.) Fishery landings and production for the Virginia areas of Hampton Roads, Lower Northern Neck, and Eastern Shore; the Maryland areas of Crisfield, Cambridge, and Ocean City; and the North Carolina areas of Atlantic, Beaufort, and Morehead City; together with cumulative and comparative data; for the month indicated.

New England Brokers and Importers of Fishery Products, 1959, 6 pp. (Market News Service, U. S. Fish and Wildlife Service, 10 Commonwealth Pier, Boston 10, Mass.)

(New York) Brokers and Importers of Fishery Products, New York City, 1959, 8 pp. (Market News Service, U. S. Fish and Wildlife Service, 155 John St., New York 38, N. Y.)

(Seattle) Washington, Oregon, and Alaska Receipts and Landings of Fishery Products for Selected Areas and Fisheries, Monthly Summary, January 1959, 6 pp. (Market News Service, U. S. Fish and Wildlife Service, Pier 42 South, Seattle 4, Wash.) Includes landings and local re-

ceipts, with ex-vessel and wholesale prices in some instances, as reported by Seattle and Astoria (Ore.) wholesale dealers; also Northwest Pacific halibut landings; and Washington shrimp landings; for the month indicated.

Study of the Fishing Condition of the Yellowfin in the Indian Ocean, Especially on the Annual Differences of the Hooked-Rate and Size Composition, by Koya Mimura, Contribution No. 103, 22 pp., illus., processed. (Translation of Report No. 7 of Nankai Regional Fisheries Research Laboratory, pp. 59-71, February 1958.) Pacific Oceanic Fishery Investigations, Bureau of Commercial Fisheries, U. S. Fish and Wildlife Service, Box 3830, Honolulu, Hawaii.

THE FOLLOWING SERVICE PUBLICATIONS ARE FOR SALE AND ARE AVAILABLE ONLY FROM THE SUPERINTENDENT OF DOCUMENTS, WASHINGTON 25, D. C.

Annotated Bibliography on the Cutthroat Trout, by Oliver B. Cope, Fishery Bulletin 140 (from Fishery Bulletin of the Fish and Wildlife Service, vol. 58), pp. 417-442, printed, 30 cents, 1958.

Atlantic Coast Migrations of American Shad, by Gerald B. Talbot and James E. Sykes, Fishery Bulletin 142 (from Fishery Bulletin of the Fish and Wildlife Service, vol. 58), pp. 473-490, illus., printed, 15 cents, 1958.

Development and Distribution of VINCIGUERRIA LUCETIA and Related Species in the Eastern Pacific, by Elbert H. Ahlstrom and Robert C. Counts, Fishery Bulletin 139 (from Fishery Bulletin of the Fish and Wildlife Service, vol. 58), pp. 363-416, illus., printed, 40 cents, 1958.

Distribution, Abundance, and Habits of Pelagic Sharks in the Central Pacific Ocean, by Donald W. Strasburg, Fishery Bulletin 138 (from Fishery Bulletin of the Fish and Wildlife Service, vol. 58), pp. 335-361, illus., printed, 25 cents, 1958.

Effect of New Jersey-New York Pound-Net Catches on Shad Runs of Hudson and Connecticut Rivers, by Paul R. Nichols, Fishery Bulletin 143 (from Fishery Bulletin of the Fish and Wildlife Service, vol. 58), pp. 491-500, illus., printed, 15 cents, 1958.

Larval Development, Growth, and Spawning of Striped Mullet (MUGIL CEPHALUS) Along the South Atlantic Coast of the United States, by William W. Anderson, Fishery Bulletin 144 (from Fishery Bulletin of the Fish and Wildlife Service, vol. 58), pp. 501-519, illus., printed, 25 cents, 1958.

Living and Ancient Populations of the Clam GEMMA GEMMA in a Maine Coast Tidal Flat, by W. H. Bradley and Peter Cooke, Fishery Bulletin 137 (from Fishery Bulletin of the Fish and Wildlife Service, vol. 58), pp. 305-334, illus., printed, 35 cents, 1958.

"Modifications on an Alternate-Polarity Electrode," by Robert A. Jones, article, The Progressive Fish Culturist, vol. 21, no. 1, January 1959, pp. 39-42, illus., processed, single copy 25 cents. Describes modifications of the basic design

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of an alternate-polarity electrode used to sample fish populations in Connecticut's coastal streams.

Surface Circulation in the Gulf of Maine as Deduced from Bottles, by C. Godfrey Day, Fishery Bulletin 141 (from Fishery Bulletin of the Fish and Wildlife Service, vol. 58), pp. 443-472, illus., printed, 30 cents, 1958.

"Survival and Retention of Tags, and Growth of Tagged Lake Trout in a Rearing Pond," by Paul H. Eschmeyer, article, The Progressive Fish Culturist, vol. 21, no. 1, January 1959, pp. 17-21, processed, single copy 25 cents. Part of a study that has to do with marking experiments in Lake Superior to determine the proper size of lake trout at planting and whether survival or growth may be increased by holding lake trout in rearing stations beyond their first summer.

## MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATION OR PUBLISHER MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

### BAIT FISH:

"Bait Fish Production in New York Ponds," by John L. Forney, article, New York Fish and Game Journal, vol. 4, no. 2, July 1957, pp. 150-194, printed, New York Conservation Dept., Albany 1, N. Y.

"Raising Bait Fish and Crayfish in New York Ponds," by John L. Forney, article, Cornell Extension Bulletin No. 986, pp. 1-30, printed, New York State College of Agriculture, Cornell University, Ithaca, N. Y., 1957.

### BRAZIL:

Pesca (Fish), 20 pp., processed in Portuguese. Ministerio da Agricultura, Servico de Estatistica da Producao, Rio de Janeiro, Brazil, November 1958. Presents statistics on landings and production of fishery products for 1955-57.

### CANADA:

Annual Report of the Department of Natural Resources of the Province of Saskatchewan for the Fiscal Year Ended March 31, 1958, 142 pp., illus., printed, Department of Natural Resources, Province of Saskatchewan, Regina, Saskatchewan, Canada, 1958. A compilation of reports of the branches of the Saskatchewan Department of Natural Resources, including an 18-page report of the Fisheries Branch. The fisheries report covers activities in management, research, fish culture, and administration for commercial and sport fisheries. Statistical data are also given on fish production and value.

Annual Report of the Fisheries Research Board of Canada, 1957-1958 (For the Fiscal Year Ended March 31, 1958), 195 pp., illus., printed, Fisheries Research Board of Canada, Ottawa, Canada. Reports on the activities of the biological and technological stations of the Fisheries Research Board of Canada--an organization in charge of advisory, consultative, and administrative functions of fishery research stations and investigations of practical and economic problems connected with the fisheries of Canada. Contains a brief summary of the Board's work and progress made during 1957-1958. Details of the investigations by the Board's various research stations are given in individual reports.

The Canadian Fish Culturist, Issue 23, December 1958, 49 pp., illus., printed. Information and Educational Service, Department of Fisheries, Ottawa, Canada. Contains the following papers: "Observations on the Spawning of Lake Trout, *Salvelinus namaycush*, and the Post-Spawning Movement of Adult Trout in Lake Simcoe," by H. R. McCrimmon; "The Survival of Yearling Lake Trout Planted in South Bay, Lake Huron," by F. E. J. Fry and J. C. Budd; "Notes on the Food of the Young of Three Species of Pacific Salmon in the Sea," by Murvel E. Annan; "A Direct-Current Electrofishing Apparatus Using Separate Excitation," by A. R. Murray; "Back-Pack Fish Shocker," by A. A. Blair; and "Experiments with Toxaphene as a Fish Poison," by George E. Stringer and Robert G. McMynn.

Progress Reports of the Atlantic Coast Stations, no. 70, 36 pp., illus., printed in French and English. Queen's Printer and Controller of Stationery, Ottawa, Canada, September 1958. Contains the following articles: "Distribution of the Inshore Catch of Cod in Newfoundland and Labrador Waters in the Years 1947 to 1949," by W. Templeman; "Herring Tagging in the Bay of Fundy (June to August, 1957)," by R. A. McKenzie and S. N. Tibbo; "Survival and Utilization of Atlantic Salmon of the Little Codroy River, Newfoundland," by A. R. Murray; "A Simple Method of Checking on the Sources of Fillet Contamination in Fish Plants," by C. H. Castell; "Grand Bank Tagged Dogfish Moves to Iceland," by W. Templeman; and "Recent Trends in the Scallop Fishery of Eastern Canada," by L. M. Dickie.

Progress Reports of the Pacific Coast Stations, no. 112, 23 pp., illus., printed. Fisheries Research Board of Canada, Ottawa, Canada, December 1958. Among the articles included are: "Application of Refrigerated Sea Water Fish Holding to a Small Combination Fishing Vessel," by S. W. Roach and J. S. M. Harrison; "Effect of Chlortetracycline (CTC) Antibiotic on the Keeping Quality of Lingcod Stored in Refrigerated Sea Water," by B. A. Southcott, E. G. Baker, and H. L. A. Tarr; "Food of the Northern Sea Lion," by Gordon C. Pike; and "Distribution of Chlortetracycline (CTC) Antibiotic in Ice Made from Hard Waters," by R. H. Moyer, B. A. Southcott, and H. L. A. Tarr.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Specification for Fish: Fresh, Frozen and Prepared, 32-GP-141a, October 17, 1958 (Supercedes 32-GP-141, November 3, 1955), 11 pp., processed, 25 Canadian cents. This specification applies to fresh, frozen, and prepared fish, suitable for human consumption, which may be iced, scaled, dressed, filleted, steaked, portioned, batter-coated, breaded or cooked and which are preserved by icing or freezing. Canadian Government Specifications Board, National Research Council, Ottawa 2, Canada.

#### CEYLON:

A Guide to the Fisheries of Ceylon, Bulletin No. 8, 74 pp., illus., printed in English. Department of Fisheries, Colombo, Ceylon, 1958. This report was written primarily to serve as a handbook to the Indo-Pacific Fisheries Council at its sessions in Colombo during December 1958. It presents an outline of the fishing industry as found in Ceylon today, in nontechnical language so that it may also be understood by laymen. The report covers sections on resources, fishing methods, utilization of catch, and administration. It also contains 3 maps of the area, a number of good photographic illustrations, and a bibliography of papers on the fisheries of Ceylon.

#### COMMISSIONS:

Gulf States Marine Fisheries Commission Ninth Annual Report 1957-1958 (to the Congress of the United States and to the Governors and Legislators of Alabama, Florida, Louisiana, Mississippi, and Texas), 36 pp., illus., printed, for limited distribution. Gulf States Marine Fisheries Commission, 312 Audubon Bldg., New Orleans 16, La. Contains the Commission's activities for the period October 1957-1958, with a summary of some of the points of general interest in the compact between the States of Alabama, Florida, Louisiana, Mississippi, and Texas. This report briefly enumerates and summarizes the activities and accomplishments of those agencies with which the organization is directly associated. Also included are short discussions of the U. S. Fish and Wildlife Service activities in technological and biological research, exploratory fishing in the Gulf area, and the Gulf fishery statistical and Market News program. A financial report of the Commission is included.

#### CONSERVATION:

Illinois Fish Conservation Teacher's Manual, by Alvin C. Lopinot, 71 pp., illus., printed. Division of Fisheries, Department of Conservation, Springfield, Ill., 1958. According to the author, "Fish conservation in Illinois has evolved from strict regulations and the rearing and stocking of fish into a complex management program with one simple purpose--to provide more and better fishing." This manual is devoted to an understanding of the problems basic to the survival of this resource which is so important as a source of food and as a means of providing recreation. Included are chapters on the history of fish conservation in Illinois, limnology, fishery biology, and some common fish of Illinois. Also includes chapters on bait minnow

propagation, lake construction, fisheries management, pollution, commercial and sport fishing, and waters in Illinois.

#### DEPARTMENT OF THE INTERIOR:

1958 Annual Report of the Secretary of the Interior (For the Fiscal Year Ended June 30, 1958), 447 pp., illus., printed, US\$1.50 (paper). U. S. Department of the Interior, Washington, D. C. (For sale by the Superintendent of Documents, Washington 25, D. C.) The activities of the Department's bureaus and offices, including the United States Fish and Wildlife Service, are summarized in this report. Among others, the activities of the Bureau of Commercial Fisheries are described. Specifically discussed are utilization of the commercial fishery resources; research in fishery biology (coastal, inland, and marine fisheries); conservation of Alaska commercial fisheries; Pribilof Islands fur-seal industry; and foreign activities. Summaries are also included of the various activities of the Bureau of Sport Fisheries and Wildlife.

#### DIRECTORIES:

The Conservation Directory (A Listing of Organizations and Officials Concerned with the Protection of Wildlife and Other Natural Resources), compiled by Steward M. Brandborg and James S. Pacy, 116 pp., printed, 50 cents. National Wildlife Federation, 232 Carroll St., NW., Washington 12, D. C. July 1, 1958. This directory is an annual publication of the National Wildlife Federation. The public agencies of national, state, and territorial governments of the United States, as well as those of neighboring nations in North and South America, are listed. Most of the nongovernment organizations in the United States which have a national or statewide scope of interest are also included.

#### ELECTRICAL FISHING:

"The Control of the Upstream Movement of Fish With Pulsated Direct Current," by Alberton L. McLain, paper, Transactions of the American Fisheries Society Eighty-Sixth Annual Meeting, 1956, pp. 269-284, printed. The American Fisheries Society, Librarian, Colorado A. & M. College, Fort Collins, Colo., 1957.

#### FISH DISTRIBUTION:

The Preferred Temperature of Fish and Their Mid-summer Distribution in Temperate Lakes and Streams, by R. G. Ferguson, 18 pp., illus., printed. (Reprinted from Journal of the Fisheries Research Board of Canada, vol. 15, no. 4, 1958, pp. 607-624.) Ontario Department of Lands and Forests, Division of Research, Maple, Ontario, Canada.

#### FISH FARMING:

Fisheries (Fish Farming, Fisheries Management), 180 pp., illus., printed. Washington State Department of Fisheries, 4015 - 20th Ave. West, Seattle 99, Wash. This review of farming, management, and international aspects of fishes is made up of the following papers: "History of Fish Farming," "Oyster Farming," "Clam Farming," "Fertilization of Water," "Hybrid Stock and Selective Breeding," "Pollution Control," and "Predator Control," by Ken McLeod;



THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

"Farming for Fishes" and "Ocean Pasturage" (reprinted from *The Sun, The Sea, and Tomorrow*); "Salmon of the Northwest and Some of the Factors Influencing their Abundance," by Clarence Pautzke; "Hatchery and Fish Farm Relationships," by C. H. Ellis, Richard T. Presssey, and Wendell Smith; "Progress in Fish Disease Control," by Brian Earp; and "International Fisheries," "Fisheries Management," and "Expectancy of Salmon," by Milo Moore.

#### FISH LADDERS:

"Fish Trap on the Trinity," article, *Outdoor California*, vol. 19, no. 11, November 1958, pp. 4-5, illus., printed. California Department of Fish and Game, 722 Capitol Ave., Sacramento, Calif. This article describes how fish do most of the work in a unique, newly completed "Rube Goldberg" fish-trapping facility on the Trinity River near Lewiston. This installation is a temporary means of preserving the important salmon and steelhead runs in the Trinity River system while construction of the high Trinity Dam is in progress. Something had to be done to detour the fish around the entire construction area. The answer was a novel type of fish-trapping facility, a system so simple that one man, during a moderate run of fish, can load upward of 100 salmon by himself. The facility is a departure from any other system in existence and is expected to attract attention from other western states, Canadian provinces, and other countries having anadromous fish runs.

#### FISH MEASUREMENT:

"The Use of Sedatives to Reduce Manipulative Error in Measuring Fish," by Wilbur L. Hartman, article, *New York Fish and Game Journal*, vol. 5, no. 1, January 1958, pp. 1-8, printed. New York Conservation Department, Albany 1, N. Y.

#### FISH POPULATIONS:

"Recent Changes in the Deep-Water Fish Populations of Lake Michigan," by James W. Moffett, paper, *Transactions of The American Fisheries Society Eighty-Sixth Annual Meeting, 1956*, pp. 393-408, printed. The American Fisheries Society, Librarian, Colorado A. & M. College, Fort Collins, Colo., 1957.

#### FISH WAYS AND FISH PROTECTION DEVICES:

"A Simplified Rotary Fish Screen and an Automatic Water Gate," by Marvin J. Whalls, paper, *Transactions of The American Fisheries Society Eighty-Sixth Annual Meeting, 1956*, pp. 371-380, printed. The American Fisheries Society, Librarian, Colorado A. & M. College, Fort Collins, Colo., 1957.

#### FISHERIES:

"How the U. S. Fisheries are Faring," by W. Adair Stewart, article, *Foreign Trade*, vol. 111, no. 3, January 31, 1959, pp. 4-6, printed, single copy 20 Canadian cents. Department of Trade and Commerce, Ottawa, Canada. According to the author, "The United States buys more fish abroad than any other country, because its fishermen cannot land enough to meet rising demand. This decline in the domestic catch favors Canada,

which continues to be the leading source of U.S. imports." The author discusses the decline in food-fish landings for 1957 as compared with 1956, the reasons for the decline in the domestic catch, and how the United States in 1957 was again the world's leading importer of fishery products.

#### FOOD AND AGRICULTURE ORGANIZATION:

Bacterial Fish Spoilage and Its Control, by Ernest Hess, FAO Fisheries Paper No. 4, 11 pp., processed (limited distribution). (Reprinted from *Food Technology*, vol. IV, no. 12, 1950, pp. 477-480.) Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy, May 1955.

Economic Influence on Design of Fishing Craft, by C. Beever, FAO Fisheries Paper No. 3, 8 pp., processed (limited distribution). (Reproduced from *Fishing Boats of the World*.) Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy, April 1955.

The Food Technologist and the World Food Crisis, by Mogens Jul, FAO Fisheries Paper No. 5, 10 pp., processed (limited distribution). (Reprinted from *Food Technology*, vol. 3, no. 9, 1949, pp. 279-283.) Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy, May 1955.

The Problem of the Introduction of Foreign Species into Inland Waters--Both Natural and Cultivated Species, by John Drake, FAO Fisheries Paper No. 2, 13 pp., processed (limited distribution). Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy, March 1955.

#### FRANCE:

NECROBIA RUFICOLLIS (F.) et NECROBIA RUFIPES (de Geer) Coleopteres Parasites des Produits de la Peche Sales et Secs (Necrobia ruficollis (F.) and Necrobia rufipes (de Geer), Parasitic Coleoptera of Salted Fishery Products), by V. H. Bertullo, C. Herrera, and B. E. Rodriguez Rivas, 7 pp., illus., printed in French with brief summary in English. (Reprinted from *Recueil de Medecine Veterinaire*, no. 3, March 1958.) Vigot Freres, Editeurs de l'Academie Veterinaire de France, 23 Rue de l'Ecole de Medecine, Paris, France.

Problemes de la Peche en Mediterranee Occidentale (West Mediterranean Fishery Problems), by F. Doumenge, 17 pp., illus., printed in French. (Reprinted from *Bulletin de L'Association de Geographes Francais*, June 1958.) L'Association de Geographes Francais, Montpellier, France.

Les Produits de la Mer de la Region Mediterranee Francaise Devant L'Entree en Vigueur du Marche Commun (Marine Products of France's Mediterranean Area in Relation to the Activation of the (European) Common Market), by F. Doumenge, 12 pp., printed in French. (Reprinted from *Bulletin du Centre Regional de la*

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Productivite et des Etudes Economiques, Third Quarter, 1958.) Centre Regional de la Productivite et des Etudes Economiques, Montpellier, France.

#### **FREEZING:**

Freezing of Fish for Canning, article, Industria Conservera, vol. 24, no. 225, March 1958, p. 66, printed in Spanish. Industria Conservera, Calle Marques de Valladares, 41, Vigo, Spain. Details are given on the process of freezing fish for canning--the time between fishing and freezing, the kind of pretreatments, and the temperature to be maintained.

#### **FRENCH WEST AFRICA:**

"Les Peches en A. O. F." (French West Africa's Fisheries), article, France Pêche, no. 24, December 1958, pp. 13-23, illus., printed. France Pêche, Tour Sud-Est, Rue de Guemene, Lorient, France.

#### **FROZEN FOODS:**

"Study Finds Frozen Precooked Crab Cakes' Heating Directions, Inadequate as Stated," by Melvin A. Benarde, article, Quick Frozen Foods, vol. XXI, no. 6, January 1959, pp. 43-44, illus., printed. The results of a study by the University of Maryland, in which the researchers determined heat penetration into commercially-prepared precooked frozen crab cakes. Several varieties of frozen crab cakes were obtained from retail stores. Since many housewives often save additional minutes in preparing precooked frozen items by placing them in cold ovens, and then bringing to suggested temperature, the samples were split--one half placed in an oven preheated according to label instructions and the second half in a cold oven. The packers' directions for home heating of precooked frozen crab cakes were found to provide inadequate heating.

#### **GENERAL:**

Climatic Temperature Changes and Commercial Yields of Some Marine Fisheries, by F. Heward Bell and Alonzo T. Pruter, 59 pp., illus., printed. (Reprinted from Journal of the Fisheries Research Board of Canada, vol. 15, no. 4, pp. 625-683, 1958.) International Pacific Halibut Commission, Seattle, Wash. The objective of this paper is to examine the basis for some of the hypotheses that have been presented concerning the effects of climatic temperature changes upon the yields of certain fisheries.

Cut Corners with Conveyors, by Morris Asimow and I. L. M. Bosticco, Technical Aid 63, 8 pp., illus., printed. Small Business Administration, Washington 25, D. C., September 1958.

"The Optimum Level of Fisheries Exploitation," by Harold C. Frick, article, Journal of the Fisheries Research Board of Canada, vol. 14, no. 5, September 1957, pp. 683-686, printed. Fisheries Research Board of Canada, Ottawa, Ontario, Canada.

"Safety in the Fishing Industry," article, New England Business Review, October 1958, pp.

1-4, illus., printed. Federal Reserve Bank of Boston, Boston, Mass. A brief article on the New England fishing industry and its problems, the hazards and accidents in the fishing industry, and safety proposals.

Strengthening American Science (A Report of the President's Science Advisory Committee), 36 pp., printed, 20 cents. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) More than a year ago an effort was made to underwrite the strength of American science and technology as one of our essential resources for national security and welfare. At that time the Science Advisory Committee was asked to make a study of ways in which the Federal Government could best serve this objective. The Committee's report specifically recommends the establishment of a new Federal Council for Science and Technology, a body to promote closer cooperation among Federal agencies in planning their programs in science and technology. The Committee concludes in its report that the task of further strengthening United States science is so broad that Government, industry, university, foundations, and individuals all have essential roles to play.

#### **GERMAN FEDERAL REPUBLIC:**

Jahresbericht über die Deutsche Fischerei, 1957 (Yearbook of the German Fisheries, 1957), 282 pp., illus., printed in German with summaries in English. Verlag Gebr. Mann, Berlin, Germany, October 1958. A review covering all phases of the German fisheries for 1957. Each chapter is followed by a summary in English and all statistical tabulations have English sub-captions.

#### **GREAT LAKES:**

"Artificial Propagation in the Management of Great Lakes Fisheries," by J. R. Dymond, paper, Transactions of The American Fisheries Society Eighty-Sixth Annual Meeting, 1956, pp. 384-392, printed. The American Fisheries Society, Librarian, Colorado A. & M. College, Fort Collins, Colo., 1957.

"Current Fisheries Research by Canadians on the Great Lakes," by W. A. Kennedy, paper, Transactions of The American Fisheries Society Eighty-Sixth Annual Meeting, 1956, pp. 419-423, printed. The American Fisheries Society, Librarian, Colorado A. & M. College, Fort Collins, Colo., 1957.

"Origin and Dispersal of the Alewife, *Alosa pseudoharengus*, and the Gizzard Shad, *Dorosoma cepedianum*, in the Great Lakes," by Robert Rush Miller, paper, Transactions of The American Fisheries Society Eighty-Sixth Annual Meeting, 1956, pp. 97-111, printed. The American Fisheries Society, Librarian, Colorado A. & M. College, Fort Collins, Colo., 1957.

"The Role of the Great Lakes Fishery Commission in the Solution of Great Lakes Problems," by John L. Farley, paper, Transactions of The American Fisheries Society Eighty-Sixth An-

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nual Meeting, 1956, pp. 424-429, printed. The American Fisheries Society, Librarian, Colorado A. & M. College, Fort Collins, Colo., 1957.

#### GULF OF MEXICO:

The Fishes of Mobile Bay and the Gulf Coast of Alabama, by Herbert T. Boschung, 626 pp., printed. Department of Biology, University of Alabama, Tuscaloosa, Ala., 1957.

#### HICKORY SHAD:

The Hickory Shad Unmasked, by Romeo Mansueti, 4 pp., illus., printed. (Reprinted from Nature Magazine, vol. 51, no. 7, August-September 1958, pp. 351-354, 386.) Maryland Department of Research and Education, Chesapeake Biological Laboratory, Solomons, Md.

#### INSPECTION:

Controlling Inspection Costs in Small Plants, by Robert E. Heiland, Management Aid 96, 4 pp., printed. Small Business Administration, Washington 25, D. C., July 1958.

#### INSTRUMENTS:

A Device for Observing Bottom Currents, by Dr. J. N. Carruthers, article, 3 pp., illus., printed. (Reprinted from Fishing News, no. 2362, July 25, 1958, pp. 6-7.) Arthur J. Heighway Publications Ltd., 110 Fleet St., London, E. C. 4, England. The author believes "that various instruments developed by oceanographers could, in their simplest forms, be of practical use to commercial fishermen. Seine net fishermen have been heard to say that they would like to know for certain how 'the tide is running' on the bottom when the time for hauling comes." This article describes a simple and inexpensive device which can easily and quickly tell the speed and direction of the bottom current as long as the water depth does not exceed 70 fathoms. The device does not require the ship to be anchored, nor does it require good weather.

#### ISRAEL:

"Biological Data on Tilapia galilaea and Tilapia nilotica in the Fish Ponds," by A. Yashouv, article, Bamidgeh, Bulletin of Fish Culture in Israel, vol. 10, no. 3, November 1958, pp. 47-52, illus., printed in English and Hebrew. Fish Culture Research Station, Dor, Israel.

Fishermen's Bulletin, no. 18, December 1958, 30 pp., illus., printed in Hebrew. Ministry of Agriculture, Division of Fisheries, P. O. B. 699, Haifa, Israel. Contains, among others, the following articles: "Around the Fisheries of Israel," by M. Shavit; "The Sea Fisheries of India," by R. Ruppin; "Experiments with the Danish Trawl Net on Board of R/F/V 'Havzi'," by D. Bernstein; "Trawl Nets from Japanese Synthetic Fibers;" "Trawl Nets Made of Webbing Produced in Israel;" "On the Otter Board Action Problem;" and "Note on the Construction of Trawl Nets Made from Machine Made Webbing."

"On the Possibility of Mixed Cultivation of Various Tilapia with Carp," by A. Yashouv, article,

Bamidgeh, Bulletin of Fish Culture in Israel, vol. 10, no. 2, June 1958, pp. 21-29, illus., printed in English and Hebrew. Fish Culture Research Station, Dor, Israel.

#### JAPAN:

"Les Methodes de Peche au Japon" (The Methods of Fishing in Japan), article, La Peche Maritime, vol. 38, no. 970, January 1959, pp. 33-37, illus., printed. La Peche Maritime, 190 Boulevard Haussman, Paris, France.

Technical Report of Fishing Boat, No. 12, 164 pp., illus., printed in Japanese with brief English abstracts. Fishing Boat Laboratory, Production Division, Ministry of Agriculture and Forestry, Tokyo, Japan, October 1958. Contains, among others, the following reports: "Model Test of European Wooden Trawler," by Nobutate Yokoyama and Tsutomu Kobayashi; "Some Report on a Two-Boat-Trawler Operating on the East China Sea from the Naval Architectural Point of View," by Tsutomu Tsuchiya; "Smaller Type Sensitive Net-Height Self-Recorder, Self-Recording Tensionmeter for Head and Ground Ropes, Net-Against-Water Speedmeter, and the Experimental Results of these Instruments on Two-Boat-Trawl Net and the Otter Trawl Net," by Chikamasa Hamuro and Kenji Ishii; "Study on the Self-Recording Net Depth Meter, the Echo-Sounding Machine for the Set Net and Results Thereof," by Chikamasa Hamuro, Kenji Ishii and Katsuji Honda; "Noise of Creatures in Sea in Region of Ultrasound," by Tomiju Hashimoto and Yoshinobu Maniwa; "Study on Fish-Finder for Ground Fish on the East China Sea," by Minoru Nishimura; "Detection of King Crab by Fish Finder," by Tomiju Hashimoto and Minoru Nishimura; and "Comparison Between Survey Map by 14.5 kc Fish-Finder and that by 200 kc Fish-Finder with Sharp Beam on Same Sea," by Tomiju Hashimoto and Yoshinobu Maniwa.

#### LAKE TROUT:

"The Near Extinction of Lake Trout in Lake Michigan," by Paul H. Eschmeyer, paper, Transactions of The American Fisheries Society Eighty-Fifth Annual Meeting, 1955, pp. 102-119, printed. The American Fisheries Society, Librarian, Colorado A. & M. College, Fort Collins, Colo., 1957.

Studies on River-Spawning Populations of Lake Trout in Eastern Lake Superior, by K. H. Loftus, 19 pp., illus., printed. (Reprinted from Transactions of the American Fisheries Society, vol. 87, 1957.) Fish and Wildlife Division, Ontario Department of Lands and Forests, Sault Ste. Marie, Ontario, Canada, 1958.

#### LIMNOLOGY:

"Limnological Surveys of the Great Lakes--Early and Recent," by Stanford H. Smith, paper, Transactions of The American Fisheries Society Eighty-Sixth Annual Meeting, 1956, pp. 409-418, printed. The American Fisheries Society, Librarian, Colorado A. & M. College, Fort Collins, Colo., 1957.

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**MACKEREL:**

"Biology of the Atlantic Mackerel (*Scomber scombrus*) of North America. Part I--Early Life History. Part II--Migrations and Habits," by Oscar Elton Sette, article, *Dissertation Abstracts*, vol. 17, no. 11, p. 2718, printed. University Microfilms, University of Michigan, Ann Arbor, Mich.

**MARYLAND:**

Maryland Commercial Fisheries Statistics, 1957, Chesapeake Bay and Tributaries, Ref. No. 58-57, 2 pp., processed. Maryland Department of Research and Education, Chesapeake Biological Laboratory, Solomons, Md., December 1958. The quantity and value of fish landings in the Chesapeake Bay and tributaries by species, and the total landings by species and gear.

**NEW YORK:**

"Small Marine Fishes of New York. Part I - The Forage Fishes," by Alfred Perlmutter, article, *The New York State Conservationist*, vol. 13, no. 2, October-November 1958, pp. 23-26, 36, illus., printed, single copy 50 cents. New York State Conservation Department, State Campus, Albany, N. Y. This is the first of a series of articles describing the more important species of the small marine fish. Illustrations are also included of several species which are important as forage fish--food for other fish.

**NETHERLANDS:**

Annual Report of the Netherlands Whaling Company, 1957/58, 15 pp., illus., printed in Dutch. Nederlandse Maatschappij Voor de Walvisvaart, Amsterdam, Netherlands.

**NORWAY:**

"Rapport om Tokt med G. O. Sars til Nord-Norge, Barentshavet og Gronlandshavet 1. Mars til 5. Mai 1958" (Report on the Trip of the G. O. Sars to North-Norway, Barents Sea and Greenland Sea from March 1 to May 5, 1958), by L. Midtun and G. Saetersdal, article, *Fiskets Gang*, vol. 44, no. 31, July 31, 1958, pp. 408-412, illus., printed. Fiskets Gang, Postgiro Nr. 691 81, Bergen, Norway.

"Rapport om Tokt med Johan Hjort til Barentshavet Juli 1958" (Report on the Trip of the Johan Hjort to the Barents Sea, July 1958), by G. Saetersdal, article, *Fiskets Gang*, vol. 44, no. 44, October 30, 1958, pp. 569-571, illus., printed. Fiskets Gang, Postgiro Nr. 691 81, Bergen, Norway.

**OCEANOGRAPHY:**

"Une Methode Simple pour Determiner la Vitesse et la Direction des Courants de Fond" (A Simple Method for Determining the Intensity and Direction of Deep Currents), article, *France Peche*, no. 24, December 1958, pp. 30-32, illus., printed. France Peche, Tour Sud-Est, Rue de Guemene, Lorient, France.

"Observations of the Pacific Equatorial Undercurrent," by Joseph E. King and John A. Knauss, article, *Nature*, vol. 182, no. 4635, August 30, 1958, pp. 601-602, printed. St. Martin's Press, Inc., 103 Park Ave., New York 17, N. Y.

**POND FISHERIES:**

"Some Factors Related to Success of Fish Populations in Iowa Farm Ponds," by Robert B. Moorman, paper, *Transactions of The American Fisheries Society Eighty-Sixth Annual Meeting*, 1956, pp. 361-370, printed. The American Fisheries Society, Librarian, Colorado A. & M. College, Fort Collins, Colo., 1957.

**POPULATION SIZE:**

"The Estimation of Population Size by a Marking and Recapture Procedure," by D. B. DeLury, article, *Journal of the Fisheries Research Board of Canada*, vol. 15, no. 1, January 1958, pp. 19-25, printed. Fisheries Research Board of Canada, Ottawa, Ontario, Canada.

**SALMON:**

"Reactions of Juvenile Pacific Salmon to Light," by W. S. Hoar, M. H. A. Keenleyside, and R. G. Goodall, article, *Journal of the Fisheries Research Board of Canada*, vol. 14, no. 6, November 1957, pp. 815-830, printed. Fisheries Research Board of Canada, Ottawa, Ontario, Canada.

**SEAWEED:**

"Third International Seaweed Symposium," by W. D. Richardson and E. T. Dewar, article, *Nature*, vol. 182, no. 4652, December 27, 1958, pp. 1779-1781, printed. St. Martin's Press, Inc., 103 Park Ave., New York 17, N. Y. A brief article describing some of the papers presented at the third International Seaweed Symposium held in Galway, Ireland, during August 13-15, 1958. Some 220 scientists and industrialists from 27 countries in Europe, Asia, Africa, and the Americas attended.

**SOUTH CAROLINA:**

Annual Report, 1957-1958. Contribution No. 30, 15 pp., illus., printed. (Reprinted from Report of South Carolina Wildlife Resources Department, Fiscal Year July 1, 1957-June 30, 1958.) Bears Bluff Laboratories, Wadmaw Island, S. C., January 1959. A detailed description of the activities of Bears Bluff Laboratories for the period under review, covering the study of oysters, shrimp, crabs, finfish, and pond cultivation.

**SQUID:**

"Squid, *Illex illecebrosus* (LeSueur), in the Newfoundland Fishing Area," by H. J. Squires, article, *Journal of the Fisheries Research Board of Canada*, vol. 14, no. 5, pp. 693-728, printed. Fisheries Research Board of Canada, Ottawa, Ontario, Canada.

**STRIPED BASS:**

The Development of Anal Spines and Soft-Rays in Young Striped Bass, *ROCCUS SAXATILIS*, by Romeo Mansueti, Contribution No. 113, 14 pp., illus., printed. Maryland Department of Research and Education, Chesapeake Biological Laboratory, Solomons, Md., April 1958.

Eggs, Larvae and Young of the Striped Bass, *ROCCUS SAXATILIS*, by Romeo Mansueti, Contribution No. 112, 37 pp., illus., printed. Maryland Department of Research and Education,



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Chesapeake Biological Laboratory, Solomons, Md., April 1958.

#### SWORDFISH:

The Emperor Wears a Sword, by Bernard L. Gordon, 3 pp., illus., printed. (Reprinted from Nature Magazine, February 1959.) Rhode Island College of Education, Providence, R. I. A short article on the swordfish, *Xiphias gladius*, a pelagic offshore fish found on both sides of the Atlantic. The swordfish is one of the few creatures of the sea that is still pursued by New England harpooners.

#### TAGGING:

"Movements of Tagged Whitefish in Northern Lake Huron and Georgian Bay," by John Budd, paper, Transactions of The American Fisheries Society Eighty-Sixth Annual Meeting, 1956, pp. 128-134, printed. The American Fisheries Society, Librarian, Colorado A. & M. College, Fort Collins, Colo., 1957.

#### TRADE AGREEMENTS:

"Trade Agreements Legislation: A Section-by-Section Analysis," by Honore M. Catudal, article, The Department of State Bulletin, vol. XXXIX, printed, single copy 25 cents; Part I in no. 1017, publication 6742, December 22, 1958, pp. 1013-1019; Part II in no. 1018, publication 6748, December 29, 1958, pp. 1050-1055. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) Department of State, Washington, D. C.

#### TUNA:

"Experiencia Espanola de un Ano, al Sur del Ecuador" (A Spanish Tuna Vessel's One-Year Trip South to Ecuador), article, Industrias Pesqueras, vol. 32, no. 760, December 15, 1958, pp. 6-7, illus., printed in Spanish. Industrias Pesqueras, Policarpo Sanz 21-22, Vigo, Spain.

"El Problema del Atun en la Industria Conservera Francesa" (The Tuna Problem in France's Fish Canning Industry), by Alevin, article, Industria Conservera, vol. 24, no. 232, October 1958, p. 277, printed in Spanish. Calle Marques de Valladares, 41, Vigo, Spain.

"Tuna Resources of the Tropical and Sub-Tropical Western Atlantic," by Stewart Springer, paper, Transactions of The American Fisheries Society Eighty-Fifth Annual Meeting, 1955, pp. 13-17, printed. The American Fisheries Society, Librarian, Colorado A. & M. College, Fort Collins, Colo., 1957.

#### UGANDA:

Annual Report of the Game and Fisheries Department (For the Period 1st July 1956 to 30th June 1957), 89 pp., illus., printed. Government Printer, P. O. Box 33, Entebbe, Uganda, 1958. General statistics and information on supplies of fishing gear; fish production, consumption of fish in Uganda, and exports of fish for 1956; boat building and mechanization of craft; angling, fisheries research; and fish farming are some of the subjects covered. Includes a section on the fisheries of Uganda by regions: Lake Albert; Lakes George/Edward; and Lake Kyoga.

Deep-water fishing experiments on Lake Albert and experimental fishing on Lake Niamusigeri are also discussed. Other sections of the report deal with game.

#### URUGUAY:

Preparacion de Conservas de Pescados y Mariscos (Preparation of Fish and Shellfish for Canning), by Victor H. Bertullo and Fernando Perez Hettich, 7 pp., printed in Spanish with brief summary in English. (Reprinted from Anales de la Facultad de Veterinaria, vol. VII, no. 5, 1957.) University of the Republic of Uruguay, Montevideo, Uruguay.

SARCINA SREENIVASANI, n.sp. Bacteria Productora del "Rojo" en las Salazones de Pescado, en el Uruguay (Bacteria, *Sarcina sreenivasani*, n.sp., which Produces "Red" in Salted Fish in Uruguay), by Victor H. Bertullo and Fernando Perez Hettich, 11 pp., printed in Spanish with brief summary in English. (Reprinted from Anales de la Facultad de Veterinaria, vol. VII, no. 5, 1957.) University of the Republic of Uruguay, Montevideo, Uruguay.

#### WASHINGTON:

Washington State Department of Fisheries, 67th Annual Report, 1957, 142 pp., illus., printed. Washington State Department of Fisheries, Seattle, Wash. This report embraces an account of the Department of Fisheries during 1957 in the field of fish farming, stream improvement, hatcheries, research, and law enforcement and contains complete statistics covering commercial fishing operations throughout the State. Portions of the report also define the objectives of the Department for managing and rehabilitating the fisheries of the State during the next biennium.

#### WHALING:

Follow the Whale, by Ivan T. Sanderson, 445 pp., illus., printed, \$6.50. Little, Brown and Company, Boston, Mass., 1956. "Follow the whale" is what the reader does when he reads this book. Historically the author leads us from prehistory, through Neolithic times to the present. Geographically the book leads us from the Arctic through most of the seven seas to the Antarctic. We meet the whalers of the Stone Age, the Norsemen, the Phoenicians, Greeks, and Basque. On to more recent times, the author describes the whaling fleets of America, Britain, Holland, Germany, U. S. S. R., and Japan. But this is not only the story of whaling but of the whale itself. The forgotten and more neglected aspects of whaling history are vividly captured by the author. The book answers these questions: Why did the men go whaling; who among men have done so; when did they go; where did they go; how did they get there; and what did they find? After presenting a general whaling chronology and notes on maps, the book begins its recital of whaling through the ages. The book has seven parts. Part I - the prehistoric period; part II - the ancient period; part III - the early period; part IV - the middle period; part V - the late period; part VI - the modern period; and part VII - the posthistoric period. There are several appendices which include a chronology of whaling from 1550 A. D. to 1950 A. D.; the chronology of whales from 60,000,000 B. C. to 1950

A. D.; the evolution of whale tails; comparative sizes of whales; an illustrated list of living whales; and a bibliography by periods and subjects. Also included is an index. The charts in the book are particularly interesting since they illustrate the feeding grounds and migration patterns of the whales and sea currents on which the whales depend. The author, however,

does not merely recite facts and figures but brings the subject of whaling to life. Man is almost anonymous in the story, but nonetheless it is a story of courage and drama, excitement and danger, and throughout there is an underlying air of tragedy and pathos.

--Joseph Pileggi



#### SUBSTANCE WITH REPELLENT EFFECT ON SALMON

Scientists of the Fisheries Research Board of Canada, Ottawa, have isolated a substance--L-serine--which has a repellent effect on salmon. An effective repellent may be the answer for deterring salmon from dangerous physical barriers and polluted waters. Used in conjunction with attracting stimuli, salmon could be directed to an alternative course around obstacles to migration imposed by industrial development and increasing use of natural waters for other purposes. When migrating salmon ascending a fish ladder were exposed to human hand rinses upstream, movement of the salmon was halted until the scent in the water dissipated. The fish displayed considerable alarm reaction by rapid movements, and in some instances retreated to a lower level of the fishway. The substance which repulses the salmon is believed to be a secretory product associated with perspiration (Canadian Fisherman, February 1958).

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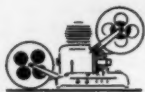
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#### FISHERY MOTION PICTURE



The following motion picture is available only from the source given in the listing.



**Outdoor Fish Cookery**, is a 16-mm. 28-minute sound and color film that features nine American fish "cook-outs," filmed to reflect the heritage and tradition of the areas portrayed. The film is designed to intrigue those who cook outdoors--either in the open spaces or in their own backyards.

The film is the 16th in a series of fishery educational motion pictures produced by the Bureau of Commercial Fisheries, United States Fish and Wildlife Service, all of which are available to interested groups on a free-loan basis. The film was produced under the Saltonstall-Kennedy Act to aid in the development of the domestic fishing industry and to expand the market for fishery products. It has been cleared for television.



The picture starts with a colorful Indian salmon barbecue on Neah Bay, Wash., and features salmon being caught and cooked in the manner typical of the days when the northwest was young. This method can be adapted for use in one's own backyard.

Another sequence is taken from the other side of the country--a real New England clambake at Gloucester, Mass.--where clambakes have been the vogue since the days of the colonies.

Gloucester Point, Va., where oyster roasts have been popular since the historic days of Jamestown and Williamsburg is the scene of another sequence in the film.

Cold-weather fans are not forgotten and will get a thrill out of the ice-fishing for smelt and the cooking of perch up at Menominee, Mich., across the line from Marinette, Wis.

Then there is the Carolina "pine-bark stew" cooked in a bayou setting, and a Florida mullet smoke, showing the fish caught near Stuart and Salerno in Martin County and smoked on a fashionable patio in Miami; not to forget the shrimp boil at Morgan City with its "do-it-yourself" tips; nor the "political fish fry" at Port Clinton, Ohio, where the fish get much more attention than the speakers.

Of course there is the Maine lobster boil--this one featuring colorful scenes at the famous Rockland Seafood Festival, where even persons with small appetites get two lobsters and where everyone has fun.

Bureau of Commercial Fisheries' films are available on loan for free showings through nearly 150 film libraries. To borrow any of the films, or for more information about them, write to the Bureau of Commercial Fisheries, U. S. Department of the Interior, Washington 25, D. C.



